NETWORK WORLD
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User, vendor camps rally to boost ISDN

By Bob Wallace
Senior Editor

NEW YORK — In an unprecedented show of unity, users, switch manufacturers, RBHCs and customer premises equipment vendors will meet here this week to voice support for a group of Bellcore technical references (TR) designed to improve interoperability of ISDN products and services.

The gathering, sponsored by the Corporation for Open Systems International, will include such Integrated Services Digital Network champions as General Motors Corp. and Eastman Kodak Co., as well as AT&T Network Systems Group, Digital Equipment Corp., IBM, Northern Telecom, Inc., Siemens Stromberg-Carlson, and other vendors.

Central office switch and customer premises equipment vendors will detail plans to support capabilities specified in the Bell Communications Research TRs beginning in 1992.

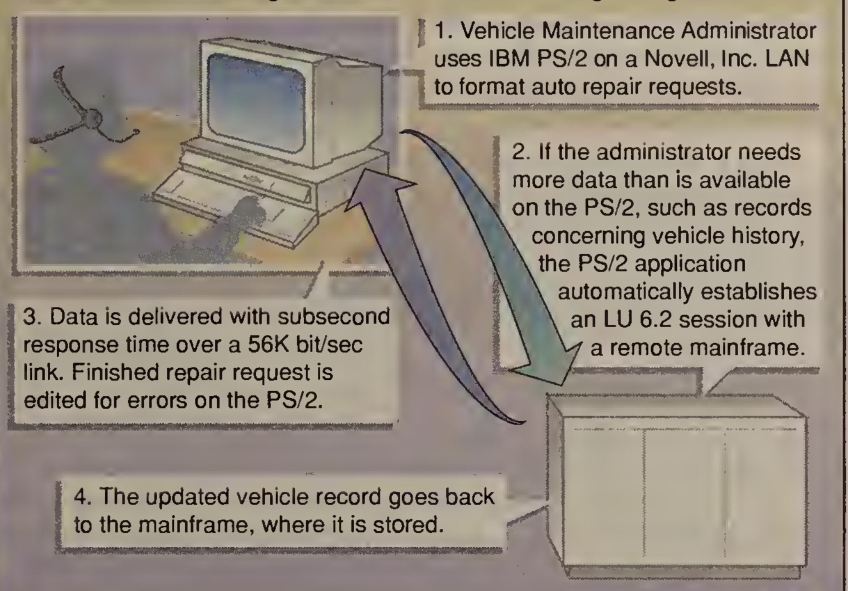
The companies are hoping that adoption of the Bellcore specifications will spur wider availability and use of ISDN.

"This is truly a watershed event. I applaud the vendors' efforts," said James Kendrick,

(continued on page 6)

GE unit banks on cooperative processing

Network integrates LAN environment with remote hosts and gives fleet service a strategic edge


1. Vehicle Maintenance Administrator uses IBM PS/2 on a Novell, Inc. LAN to format auto repair requests.
2. If the administrator needs more data than is available on the PS/2, such as records concerning vehicle history, the PS/2 application automatically establishes an LU 6.2 session with a remote mainframe.
3. Data is delivered with subsecond response time over a 56K bit/sec link. Finished repair request is edited for errors on the PS/2.
4. The updated vehicle record goes back to the mainframe, where it is stored.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: GE CAPITAL FLEET SERVICES, EDEN PRAIRIE, MINN.

GE seeks service edge via cooperative processing net

By Paul Desmond
Senior Editor

EDEN PRAIRIE, Minn. — GE Capital Fleet Services (GECFS) is relying on cooperative processing in its Systems Network Architecture net to support an array of enhanced customer services that are expected to give the company an edge over competitors.

By transparently linking local-area network-based applications to remote mainframe programs, the company has cut response time and provided workers with access to more information. As a result, it has been able to dramatically improve productivity while keeping staff at a minimum.

The wealth of information the network can coalesce also helps GECFS clients save money, which promises to generate business.

GECFS is the largest company leasing vehicles to corporate clients in North America, said Larry Runge, director of advanced systems technology. The leasing business is becoming a commodity market, he said, so leasing firms are trying to distinguish themselves based on service.

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Squabble over radio spectrum heats up

FCC chairman says effort to accommodate new technologies will affect current microwave users.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The FCC is planning to displace licensed microwave users to make room for emerging wireless voice and data communications technologies, FCC Chairman Alfred Sikes told Congress last week.

Sikes made his comments while speaking to the House Telecommunications and Finance Subcommittee during a hearing on The Emerging Telecommunications Technologies Act of 1991. The remarks represent the clearest statement to date that microwave users will be affected by the Federal Communications Commission's spectrum review.

Sikes also briefly touched on the controversial concept of auctioning off radio spectrum for use in telecommunications, saying he favors the idea to ensure that the finite resource is used efficiently. He said spectrum used by the broadcast industry would be excluded from the auction.

His backing of the auctioning idea is expected to stir controversy as it has in the past when the concept was floated by the Carter and Reagan administrations. The Bush administration has also backed the idea (see "Deregulation theme of Bush proposal for telecom mart," page 11).

While the auctioning issue is

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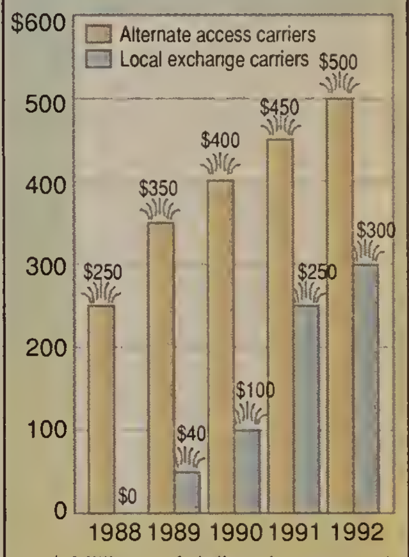
Local fiber net investments



▲ Millions of dollars in past and predicted expenditures

SOURCE: THE YANKEE GROUP, BOSTON
GRAPHIC BY SUSAN J. CHAMPENY

Shakeout looms over bypass mart

By Bob Brown
Senior Editor

DALLAS — Faced with a weak economy, a shortage of capital and the RBHCs' aggressive deployment of fiber, the alternative access industry is ripe for a shakeout during the next 12 to 18 months, according to industry observers.

A market shakeout could damage user confidence in bypass service providers in the short term. But ultimately, it could result in the emergence of a smaller group of alternative access carriers that would represent even stronger competition for the local telephone companies.

"In the short run, some users will be wary about whether alternative access carriers with networks in just a few [cities] are viable businesses," explained Mark

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NETLINE

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HP TO UNWRAP aggressively priced devices for 10BaseT, fiber LANs. Page 2.

HUGHES CUTOVER TO DECnet Phase V will enable user to support more subnets, simplify network addressing. Page 2.

US WEST ADMITS GUILT, accepts $10m fine for MFJ violations in exchange for halting investigation. Page 2.

US SPRINT SLIPS AGAIN on promised delivery of consolidated billing service. Page 3.

BANK'S PC-BASED videoconferencing system brings together financial experts, customers. Page 5.

NEW MCI PREFERRED flat-rate pricing plan offers custom net features for small users. Page 5.

NEWSPAPER

FEATURE

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New pricing makes VSAT nets far more attractive

By Philip Arst
Special to Network World

Satellite networking, the one leap into space that network managers are ever likely to take, has been a seemingly attractive mass-market transmission alternative since the first very small aperture terminals appeared in the mid-1980s.

But today, although hundreds of satellite nets are in operation, satellite networking has not yet proven to be cost-effective enough to lure thousands of users from terrestrial networks.

All that may be changing, however. Fortuitously, the costs of satellite networks have been plunging and the benefits have been rising in recent months, making it a good time to take another look at satellite options.

In recent years, the VSAT industry has been restructured.

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HP to bolster LAN line with new 10BaseT, fiber devices

Aggressively priced products include new hub, transceivers, OpenView software enhancements.

By Caryn Gillooly
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. today will announce a series of aggressively priced products that make it easier and less expensive to install structured wiring systems for local-area networks.

HP will unveil its HP EtherTwist Hub Plus/48, HP Fiber Optic Hub Plus, HP Fiber Optic transceiver, HP ThinLAN transceiver, HP EtherTwist EISA Adapter Card/32 and enhancements to its OpenView network management software.

Analysts said the introduction of the HP EtherTwist Hub/48, a 48-port, 10BaseT intelligent repeater codeveloped with chip maker Advanced Micro Devices, Inc. (AMD) of Sunnyvale, Calif., is the most significant of the new products. Unlike loadable chassis hubs, the EtherTwist Hub/48 is a closed unit that features an extremely low per-port cost — about $166 per port vs. $263 to $347 per port on other hubs.

It provides as many as 48 ports to connect workstations via cabling conforming to the Institute of Electrical and Electronics Engineers, Inc. 10BaseT stan-

(continued on page 51)

Hughes Aircraft preps for DECnet Phase V migration

Set to install multiprotocol routers in net this fall.

By Jim Brown
Senior Editor

LONG BEACH, Calif. — Hughes Aircraft Co. plans to begin migrating to DECnet Phase V as early as this fall when it starts installing multiprotocol routers throughout its Engineering Design Network (EDEN).

Although Digital Equipment Corp.'s Open Systems Interconnection-based DECnet Phase V software will not be available by then, the multiprotocol routing backbone will provide a framework to support DECnet Phase V routing.

Migration to DECnet Phase V will give Hughes the ability to continue adding subnets to its backbone as it expands to new locations or acquires firms. Hughes is quickly exhausting the number of subnets, or DECnet areas, allowed under DECnet Phase IV and could use DECnet Phase V's extensive address space to add more. However, with delivery of DECnet Phase V delayed until next year, Hughes is doing what it can now to make the migration easier.

"We can start by doing things that don't require us to have the actual Phase V product," said Gene MacLean, the EDEN section head responsible for network planning and operations support. This includes building the multi-

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US West admits to violating MFJ restrictions, pays fine

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — US West, Inc. recently became the first regional Bell holding company to ever admit to having violated Modified Final Judgment restrictions and agreed to pay a $10 million fine in exchange for the Department of Justice dropping an investigation into additional alleged violations.

US West admitted that, on four occasions between 1985 and 1989, it violated the prohibitions spelled out in the 1984 decree that was used in the separation of the RBHCs from AT&T.

Specifically, the company violated prohibitions on information services, manufacturing and, in one instance, interexchange services.

One of the company's activities also violated the judgment's rules barring discrimination between customers in the provision of telephone services.

The $10 million fine, the largest ever obtained from a single defendant by the Justice Department's Antitrust Division, is intended both to punish US West for the violations and serve as a warning to all regional Bell holding companies, the agency said in court documents. "Our goal . . . [is to make RBHCs] understand that if they do not comply, the de-

(continued on page 51)

Briefs

Wireless LAN start-up forming. A group of network industry veterans last week announced formation of a company that will enter the fledgling wireless local-area network market. Windata, Inc., based in Northborough, Mass., is being led by Greg Hopkins, former vice-president of engineering at Ungermann-Bass, Inc. Bob Heile, former general manager of the transmission products division of Codex Corp., has jumped on board as vice-president of engineering and operations. The start-up's marketing efforts are being led by Bob Rosenbaum, founder and former vice-president of marketing at Xyplex, Inc. And Charlie Bass, cofounder of Ungermann-Bass, has joined Windata's board of directors.

AT&T reworks Tariff 12 deal. AT&T has renegotiated and vastly expanded its Tariff 12 deal with American Airlines, Inc., making that contract one of the largest custom networks to date. The new deal includes network traffic from the airline's parent company, AMR Corp., and its SABRE travel reservation network.

The original deal, which was filed in November 1988, was worth a minimum of $166.5 million over five years. The revised deal will almost double in size to a minimum of $300 million over five years. This would rival the size of General Electric Co.'s Tariff 12 deal, which is also worth a minimum of $300 million over a five-year period.

Slamming bill hits Congress. Rep. Pete Stark (D-Calif.) and Rep. Bob Wise (D-W. Va.) last week introduced a bill that would order the Federal Communications Commission to monitor occurrences of "slamming," a practice whereby long-distance carriers steal customers from other carriers by pretending they have been authorized by the customer to make the switch. Separately, congressional sources said Rep. Edward Markey (D-Mass.) this week will introduce a bill addressing the privacy issues of caller ID and automatic number identification, as well as legislation regarding junk fax.

Newbridge sets layoffs. Newbridge Networks Corp., a Kanata, Ontario, maker of multiplexers and channel banks, last week said it will reduce its 1,200-person work force by no more than 10% as part of "an ongoing streamlining and concentrating of resources." The layoffs are expected to affect clerical, administrative and sales areas. Newbridge plans to make a formal announcement regarding the number of employees to be laid off some time after the company's board of directors meeting on March 6, a company spokeswoman said.

On the same wavelength. Motorola, Inc. and Northern Telecom, Inc. last week agreed to develop interoperable cellular transmission products that conform to international switching and cellular standards. Motorola issued a similar agreement last month with DSC Communications Corp. and expects to sign agreements with other cellular switching vendors in the near future.

Centrex satisfaction. South Central Bell Telephone Co. last week announced a money-back guarantee for new users of its ESSX Centrex service in Alabama, Mississippi and Tennessee that are not pleased with the service. The promotion will be extended to users in Louisiana by the end of this year and to customers in Kentucky in 1992.

Under the Unconditional Satisfaction Guarantee, dissatisfied Centrex customers can have the service removed within 90 days of installation and receive a full refund of onetime and monthly service charges. To qualify for a refund, new ESSX service subscribers must provide written notice of dissatisfaction to South Central Bell Telephone. The company will contact the user to verify the intent to remove the service and will do so within 10 days.

If a customer requires more than 10 days to arrange for replacement service, ESSX service may be retained for up to six months at the monthly rate specified in the customer's contract.

MCI acquires Lotus Express rights. MCI International last week said it has acquired the development and marketing rights of Lotus Express from Lotus Development Corp.

Lotus Express software for personal computers enables users to access MCI Mail in order to send and receive messages, spreadsheets, documents, and ASCII and binary files. MCI said it will issue a new release of the software by the end of this year, and Lotus will develop a gateway from Lotus Express to its Lotus Notes software.

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US Sprint admits further delays in complete cutover of billing service

By Bob Wallace
Senior Editor

KANSAS CITY, Mo. — US Sprint Communications Co. last week acknowledged that it has slipped behind schedule again in delivering a new billing service that provides consolidated invoicing, as well as advanced management and reporting capabilities.

US Sprint had originally planned to have all users on its Invoice Processing System (IPS) by March 1991 but later pushed that completion date back to August. The carrier now says it will not have the IPS cutover completed by the revised date, nor will it commit to a new time frame. US Sprint declined to discuss why delivery of IPS has been delayed.

The carrier has already migrated some seven million residential and small business customers to IPS, but many of US Sprint's major customers are still waiting for service. The carrier declined to say how many large users have been moved to IPS.

Current IPS customers include subscribers to basic long-distance service and Dial 1 WATS. Services yet to be brought under IPS include Virtual Private Network (VPN).

IPS provides users with one detailed bill for all services, custom management reports and on-line access to traffic data. US Sprint has spent three years and tens of millions of dollars developing the system, which was expected to give the carrier an edge over rivals by enabling it to offer a unified volume discount plan covering all services.

Major US Sprint customers last week said they are unsure what is causing the delays in delivery of IPS and do not know when they will be cut over to the system.

"We need some answers — an update on where US Sprint is with IPS," said Curtis Peterson, MIS vice-president for Matrixx Marketing, Inc., a telemarketing service bureau in Ogden, Utah, and a longtime US Sprint customer.

"We handle communications for the entire corporation. We have to be able to run this place like a telephone company and bill all subsidiaries for network services," said Ron Tuccitto, senior manager of business planning for Union Pacific Railroad. "IPS could make the process easier."

US Sprint was scheduled to hold a videoconference late last week with members of the US Sprint Users Group's Billing Subcommittee to issue an IPS status report.

"We've made adjustments. We've moved our timetable before, and we'll probably move it again because billing is very important to [US Sprint]," said a spokesman for the carrier. "We are not going to take users off something that's working today to put them on IPS until it's completely ready."

Delays in migration to IPS have, at least in part, forced US Sprint to enhance the national accounts billing system that IPS was designed to replace, the spokesman said.

Early IPS users are generally pleased with the billing service but say it only brings US Sprint billing up to the level of rival services. It hasn't been without its problems either.

"We've been using IPS since last October," said Daniel Gonos, telecommunications manager for Domino's Pizza, Inc. in Ann Arbor, Mich. "I'd say the basic package makes them a peer of AT&T and MCI. I certainly wouldn't say they're any better, but they're every bit as good.

"The one problem we have experienced is if payments get misapplied, it takes a long time to get the situation straightened out," Gonos said. Domino's receives a single bill for all its locations. The company pays multiple accounts with one check.

Gonos said US Sprint has had some trouble crediting payments to appropriate store accounts. "If the money gets parceled out correctly the first time, things are alright. But when it doesn't, it can take months to get it straightened out," he said.

On a scale of one to 10, with 10 being excellent, Domino's gave US Sprint an eight for delivering IPS bills on time. "This has been well above average," Gonos said. The carrier got a 10 for billing accuracy.

"The customized report package is pretty good," Gonos said. "They give us traffic reports, [station message detail recording data] and usage reports per trunk and trunk group. It's not that they are ter-

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Correction: The story "Users lament Tariff 12's inflexibility" (*NW*, Feb. 18) incorrectly stated the filing date for USAir, Inc.'s Tariff 12 option. It was filed in December 1989. Also, AT&T said its Bandwidth Management Service is available under Tariff 12.

Clarification: Michael Cavanagh, executive director of the Electronic Mail Association, said his remarks in the story "E-mail privacy issue gains momentum" (*NW*, Feb. 11) were intended to illustrate that work place privacy standards should be applied consistently to paper-based as well as electronic communications.

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Bank to test videoconferencing for customer/expert interaction

By Jim Brown
Senior Editor

COLUMBUS, Ohio — Huntington Bancshares, Inc. next week will begin beta-testing a microcomputer-based videoconferencing system that will enable customers to meet with mortgage specialists and securities brokers in remote offices.

The six-month test, dubbed "Talk to the Experts," is designed to make the process of applying for loans or inquiring about investment services more personal and convenient for customers. The bank holding company, which has 296 offices in 14 states, said it is also hoping to lure new customers into its branches for a chance to use a futuristic technology.

"When we look to the future, we need to find ways to be more efficient in how we deliver services," said Bill Klumpp, senior vice-president in corporate marketing. "Customers will want to talk face-to-face with experts but have the convenience of doing it from a nearby branch or even from their home someday. And this technology could certainly make that a lot easier."

While the personal computer-based videoconferencing unit being tested requires a T-1 link for full-motion video, the bank is anxious for manufacturer Palaver Systems, Inc. to deliver a system that supports videoconferencing over dial-up lines.

That would enable the bank to build automated branches equipped only with videoconferencing units and automated teller machines.

Customers would use ATMs for simple transactions, such as deposits and withdrawals, and a videoconferencing unit to speak with customer service representatives to open new accounts or learn about other services.

In its beta test, Huntington will install two Palaver Video Systems at its headquarters here and one in each of two remote locations.

A T-1 circuit will link a unit in the Private Banking Division at Huntington's headquarters to a unit in a Huntington Mortgage Co. office across town. A separate T-1 will link a unit in Huntington Investment Co.'s office at headquarters to a bank branch in Dublin, Ohio.

"We want to be able to evaluate all aspects of the technology as a stand-alone application," said Jeannine Kester, vice-president of integrated networks and communications systems at Huntington. "We don't want to run it over our existing network."

The test will benefit customers of the Private Banking Division who require complex financial services. These customers rely on a personal banker at the main office to introduce them to banking experts that can customize banking services to suit their needs.

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MCI offers new pricing, options for small users

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. last week rolled out a custom network service that offers flat-rate pricing, volume discounts and new dialing features for businesses spending as little as $50 to $1,500 a month on network services.

The carrier said its MCI Preferred service offers small business users a combination of services, consolidated billing, management reports and discounts previously unavailable to low-end customers. Services available under the package include switched voice, 800, international and a new calling card offering.

MCI rival AT&T said it offers some similar management reports and consolidated billing for smaller users but doesn't propose combined discounts on multiple services, flat-rate pricing or account codes, which enable users to break down charges by department or client.

A spokeswoman for US Sprint Communications Co. claimed there is no discernible price difference between MCI Preferred and US Sprint's Small Business Advantage service, which the carrier has offered since August. However, she could not offer any further details on the features of US Sprint's service.

MCI Preferred follows in the wake of MCI Vision, a flat-rate calling service for mid-range business customers spending between $500 and $50,000 monthly. That service, announced in June, offers volume discounts on outbound voice, international and calling card calls, consolidated billing and management reports. MCI has also become increasingly successful at selling a range of customized deals to very large users.

Angela Dunlap, vice-president of general business marketing, said MCI surveyed a large number of small businesses to find out what they wanted from service

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Shakeout looms over bypass

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Lowenstein, a senior analyst at The Yankee Group, a market research firm in Boston. "After a shakeout, a handful of carriers will survive," most likely with deeper financial reserves brought about by mergers or equity investments, he said.

At last week's annual meeting here of the Association for Local Telecommunications Services, a trade group of alternative access carriers, the mood was "incredibly optimistic," said John Shapleigh, the organization's new president. Carriers spoke of delivering new services, such as local-area network interconnection and personal communications network-related offerings.

But industry observers said there is no doubt an industry shakeout has already begun.

For example, Philadelphia Fiber Optic went out of business last year, the victim of what one analyst described as too many alternative access carriers fighting for a finite chunk of business.

Also, Dallas-based DFW MetroLink, Inc. filed for Chapter 7 liquidation under federal bankruptcy laws on Feb. 13. Michael Anderson, an attorney for MetroLink, said that although the carrier is looking for a buyer, it is continuing to sign up new customers for service.

A handful of other alternative access providers, including Institutional Communications Co. and Eastern Telelogic, are on the lookout for more funding, according to analysts.

Meanwhile, Teleport Communications Group, the industry's only profitable player, is being shopped around by owner Merrill Lynch & Company, Inc. In addition, Metropolitan Fiber Systems, Inc. (MFS), a major alternative access carrier that is not for sale, has been approached by several suitors.

Foreign long-haul carriers Cable & Wireless PLC, British Telecommunications PLC, France Telecom and Japan's Kokusai Denshin Denwa, Ltd. are among the prime candidates to acquire Teleport or other alternative access carriers, analysts said.

Their participation in the market would make sense because these carriers have deep pockets and could provide upstart alternative access carriers with long-term stability in exchange for providing their foreign parent with a better foothold in the U.S. telecommunications market, said Bob Wilkes, an analyst at Brown Brothers Harriman & Co., a New York brokerage firm.

Royce Holland, president and chief executive officer of MFS, which is operating networks in 11 cities, said an industry shakeout shouldn't surprise anyone.

"There have been a lot of new market entrants in the past five years, and it's only natural that we're going to start seeing a shakeout," he said.

Even without foreign intervention, the market for local alternative access is growing fast. Total market revenues jumped from $60 million in 1989 to $90 million last year, Lowenstein said. However, most alternative access carriers don't have more than 2% of the business services market in the cities they serve.

In order to sustain growth, the carriers must learn to compete better against the regional Bell holding companies and to cooperate with them, Lowenstein said.

The RBHCs have become increasingly tough competitors by deploying fiber rings in nearly 20 cities, most of which are served by alternative access carriers.

Last week, US West Communications, Inc., a subsidiary of US West, Inc., announced an expanded version of the Self-Healing Alternate Route Protection service it unveiled last May.

Investment by the RBHCs and other local exchange carriers in self-healing fiber rings, which was nearly nonexistent in 1988, will reach $300 million by the end of 1992, according to a recent report by The Yankee Group.

> Even without foreign intervention, the market for local alternative access is growing fast.

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Ironically, as the local loop evolves, the RBHCs will permit alternative access carriers to locate equipment in or near their central offices to provide users with easy access to alternative local access nets.

According to Robert Atkinson, Teleport's senior vice-president of regulatory and external affairs, chances are that alternative access carrier accessibility will improve in the coming months, thanks in large part to Teleport's recent success on the interconnection front. That victory came after a bitter struggle with Nynex Corp. to collocate in New York Telephone Co. central offices.

"It's helped foster an attitude among the other RBHCs that interconnection isn't the worst thing to ever happen to them," he said. Last week, Teleport's Chicago-based operation reached agreement with Illinois Bell Telephone Co. to interconnect Teleport's network with Illinois Bell central offices in Chicago.

To a large extent, the Bells are giving in to the alternative access carriers on interconnection in hopes of winning concessions from public service commissions, Atkinson said. Such a quid pro quo might come in the form of allowing the Bell company to have more pricing flexibility in exchange for allowing collocation, as is the case with New York Telephone, he said.

Later this year, a ruling is expected by the Federal Communications Commission on MFS' Local Equal Access Initiative, which proposes universal collocation.

Still, alternative access carriers have hurdles to overcome in dealing with the Bell companies.

Southwestern Bell Telephone, Atkinson said, is "acting like a dinosaur" in resisting collocation and, separately, asking the Texas Public Utility Commission to compel alternative access carriers to cease and desist until they are certified as providers of local telephone service. Atkinson described the Southwestern Bell Telephone move as an "effort to bleed some smaller companies to death by tying them up in prolonged court battles."

Bank to test videoconference

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Private Banking Division customers visiting with their personal banker at the main office will be able to use the videoconference to discuss interest rates and terms for real estate loans with a mortgage loan officer in the bank's mortgage office located some 20 miles away.

If the customer decides to apply for a loan, the loan officer will ask the customer for information and key it into a microcomputer at the remote site. A copy of the completed application can then be sent via facsimile to the main office for the customer's signature.

Klumpp said the bank wants to test a feature Palaver has under development that will enable a copy of the application to be transmitted over the videoconference link and displayed on the unit in headquarters. This will enable a customer to view data as it is keyed in at the remote site and correct any mistakes.

Also in the test, customers visiting the bank's Dublin branch will be able to establish a videoconference link with a securities broker at headquarters to discuss opening an investment account. Ohio regulations permit banks to act as brokerages that buy and sell securities.

The bank hopes providing face-to-face contact with a broker will turn more customer inquiries into actual sales, Klumpp said. Bank research shows that customers prefer to see the person who will buy or sell their securities instead of speaking to them on the phone, especially on first contact, he said.

The Palaver Video System consists of an Intel Corp. 80386-based IBM Personal Computer AT, software, a set of five Palaver boards, a camera and microphone unit, a video graphics adapter monitor that displays videoconference control information, a keyboard and a video display monitor. It is priced at $20,000.

The camera and microphone feed images and sound to an interface board in the microcomputer. Palaver's proprietary boards digitize and compress the video and audio, which is then stored as an MS-DOS file. That file is transferred via a wide-area link to a remote Palaver Video System that decompresses it and routes it to a video display monitor.

Palaver said it can digitize images at up to 30 full frames per second, the speed of a television camera. This creates a data file of 300K byte/sec, which is transferred over the wide area. Users can reduce the number of frames being digitized each second to keep the file size down, thus lowering bandwidth requirements. However, doing so will diminish the picture quality.

User, vendor camps rally

continued from page 1

aeronautical industry engineering program manager for Aeronautical Radio, Inc. of Annapolis, Md., a nonprofit group that provides communications support services for the nation's airlines.

"These TRs will be used to build the infrastructure for a ubiquitous ISDN," said Kendrick, who is also chairman of the North American ISDN Users' Forum ISDN Users' Workshop.

The first set of references is called National ISDN 1 and was created by Bellcore for its owners, the seven regional Bell holding companies. This set of TRs defines how customer premises equipment accesses an ISDN switch and how different vendors' ISDN switches interoperate using a Common Channel Signaling System 7 (CCS7) network.

Bellcore is also working to define the National ISDN 2 and 3 TRs, which build on National ISDN 1 and would support a greater level of interoperability among ISDN equipment, as well as additional ISDN features.

"This is the first step toward eliminating islands of ISDN and will go a long way toward building the use of ISDN services," said a top executive for a central office switch manufacturer who requested anonymity.

Bolstering ISDN

ISDN can use the boost. Last year, the RBHCs said less than 5% of their central offices and less than 1% of their access lines would be ISDN-ready by the end of 1990.

Last September, the RBHCs had 187 customers representing about 90,000 installed ISDN lines.

In terms of CCS7, the RBHCs estimated that they would have anywhere from 10% to 56% of their access lines supported by CCS7 by year-end 1990. They are not expected to have CCS7 fully deployed until the turn of the century.

National ISDN 1 will be based on portions of 44 Bellcore TRs. They include:

■ **TR 268, Access Call Control Switching and Signaling,** which addresses procedures for signaling over ISDN Basic Rate Interface lines and internetworking with existing networks. Bellcore said TR 268 "forms the basis upon which other requirements will build."

■ **TR 444, Switching System Requirements,** which describes procedures for using the ISDN User Part of SS7 to set up and release calls connecting to an interexchange carrier. This capability will set the stage for the interconnection of ISDN islands to form ISDN wide-area networks.

■ **TR 847, ISDN Common Switching and Signaling,** which describes features and generic requirements to accommodate multiple pieces of equipment on a single access line. This is a key capability because many users want to link multiple devices to a single ISDN line.

■ **TR 860, Calling Number Identification Services,** which offers options for caller ID display and blocking.

This is important because caller ID features are among the ISDN capabilities most sought after by businesses.

US Sprint admits further delays

continued from page 3

ribly exotic, but most of it's in English and can be processed by an employee without a lot of experience."

Other users, such as The Kroger Co. in Cincinnati, are taking a cautious approach to using IPS.

The food retailer is gearing up for a bill checking trial with IPS, under which the company will collect call details and ratings in its telemanagement system and match them against the IPS bills it receives from US Sprint.

"We'll see how well they match up at the end of March," said Jeff Wilson, telecommunications director for the retailer.

In July, Kroger acknowledged it awarded US Sprint a three-year, $15 million contract for a 2,562-site VPN. The network will link Kroger's headquarters with 1,234 supermarkets, 1,000 convenience stores and 38 food processing plants across the country. US Sprint handles about 95% of Kroger's voice traffic.

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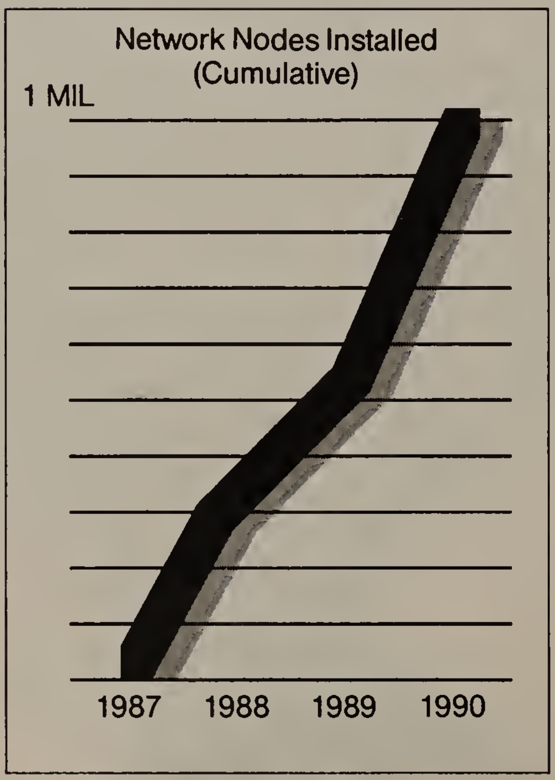

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"Lotus [Development Corp.'s] acquisition of cc:Mail [Inc.] could mark the start of an E-mail industry shakeout. During the next 12 months, we'll start seeing some small E-mail vendors closing up shop as larger vendors focus more on the market."

David Atlas
Senior analyst
International Data Corp.
Framingham, Mass.

People & Positions

Novell, Inc. last week announced that **Duane Murray,** formerly vice-president of corporate marketing at the company, has been appointed to the position of vice-president and general manager of Novell's LANalyzer Division.

Murray will be responsible for the development and marketing of Novell's network monitoring, diagnostic and analysis products. In his new position, Murray replaces **Navin Jain,** who has been appointed to head up Novell's overall network management product development.

Murray previously served in various marketing positions with Excelan, Inc., a supplier of Transmission Control Protocol/Internet Protocol software and local-area network analyzer tools that Novell acquired several years ago.

Morris Tanenbaum, AT&T vice-chairman and chief financial officer, said he will retire on May 1. Tanenbaum, 62, has spent 39 years at AT&T in various positions. He was a member of the AT&T Bell Laboratories technical staff that developed the use of silicon as a semiconductor material and pioneered the use of superconductor magnets. He was also the first

(continued on page 40)

Acquisition to help Telebit market wares to LAN users

New comm servers will tie LANs via dial-up links.

By Bob Brown
Senior Editor

SUNNYVALE, Calif. — Telebit Corp., best known as a supplier of high-speed modems, recently acquired a manufacturer of communications servers as part of its strategy to play a larger role in the local-area network and internetworking markets.

Terms of the agreement were not disclosed.

The acquisition of ParaData Computer Networks, Inc.'s Communications Products Division (CPD) adds to Telebit's product arsenal a line of asynchronous communications servers designed to tie personal computers and LANs to other LANs via dial-up links.

The CPD products support high throughput rates and feature dynamic assignment of dial-in/dial-out ports and diagnostic management. The communications servers are designed to work in Novell, Inc. NetWare and Network Basic I/O System LANs.

Telebit plans to provide integrated network management for its products and the CPD products down the road, according to Steven Hess, vice-president and chief financial officer at Telebit. However, the products already fit well together because the CPD communications servers can enable Telebit users to employ their modems more efficiently by pooling them among multiple LAN users, he said.

CPD will be treated as a separate business unit within Telebit and will continue to operate out of Farmington Hills, Mich.

The acquisition furthers Telebit's strategic evolution into the LAN and internetworking marketplace. This thrust began last year when Telebit unveiled a dial-up Transmission Control Protocol/Internet Protocol router called NetBlazer.

"Our core modem business is still the foundation of the company," Hess said. "We are now building on that foundation to diversify into the internetworking market."

Currently, modem sales account for almost all of Telebit's sales. But that is expected to change as the company focuses more on internetworking, Hess said.

Brad Baldwin, an analyst at

(continued on page 10)

INDUSTRY BRIEFS

AT&T extends bid for NCR. AT&T last week extended its offer to buy NCR Corp. from its shareholders for $90 per share in cash from midnight Feb. 15 to midnight April 30. NCR officials said the offer is inadequate.

AT&T said holders of about 66% of NCR's outstanding common shares have accepted AT&T's offer. AT&T previously reported that holders of 70% of NCR's shares agreed to the AT&T offer, but since then, 4% of the shares have been withdrawn. AT&T began its $6.12 billion takeover attempt of NCR in December. Also last week, NCR announced that its board of directors set March 28 as the date for both the special and annual meetings of its shareholders. The special meeting will give shareholders the chance to oust NCR's board of directors in an effort to smooth the way for AT&T's acquisition of NCR.

Sun to form two subsidiaries. Sun Microsystems, Inc. recently said it plans to form two subsidiaries by July 1 to develop and market workstation operating system and application software. SunSoft, Inc.'s charter is to develop Unix-based operating software for Sun's SPARCstations. Edward Zander, formerly vice-president of marketing at Sun, has been named president of SunSoft. SunTech Enterprises, Inc. has been formed to develop client/server applications. The company will market existing Sun products, including PC-Network File System software and SunLink gateway products. Eric Schmidt, previously vice-president of Sun's general systems group, has been named president of SunTech Enterprises.

Sun also said it is forming a research and development division, called Sun Laboratories, that will focus on advanced

(continued on page 10)

Top 15 U.S. cellular operators

Company	Total population
McCaw Cellular Communications, Inc.*	35,593,306
PacTel Cellular	30,083,098
Southwestern Bell Mobile Systems	28,544,640
LIN Broadcasting Corp.*	25,293,661
Nynex Mobile Communications Co.	25,075,672
GTE Mobilnet, Inc.**	23,694,874
Ameritech Mobile Communications	20,271,057
BellSouth Mobility, Inc.	18,258,270
Bell Atlantic Mobile Systems	16,369,467
US West NewVector Group, Inc.	14,881,360
Contel Cellular, Inc.**	14,346,219
American Cellular Communications Corp.	12,447,034
Centel Cellular Co.	12,331,967
Metro Mobile CTS, Inc.	9,746,688
Cellular Communications, Inc.	9,519,039

*McCaw now controls LIN Broadcasting.
**A merger between GTE and Contel is under way.

SOURCE: CELLULAR TELECOMMUNICATIONS INDUSTRY ASSOCIATION, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

FCC considers end to cellular bundling ban

While waiting for agency decision, some question the ramifications on other telecom service marts.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The FCC has proposed lifting a ban that prohibits cellular providers from selling bundled packages of equipment and services, a move that seems to increase momentum for the agency's effort to allow bundling in other markets such as long distance.

Current Federal Communications Commission policy prohibits any common carrier from offering equipment discounts or giveaways in connection with provision of services. The FCC has already proposed eliminating restrictions on bundling long-distance services and customer premises equipment, but last week's pronouncements on the benefits of bundling underscore the FCC's support for the concept.

FCC officials, including Chairman Alfred Sikes, voiced strong support for allowing bundling in the cellular market, saying it would benefit consumers and promote competition.

But the FCC insisted that dropping the ban on bundling for the cellular market would not affect the long-distance market or any others.

"The interexchange market is not at issue here," said Richard Firestone, chief of the Common Carrier Bureau.

However, some insiders questioned how the agency could confine bundling to only the cellular market.

"Cellular is far less competitive than the interexchange market," said Michael Wack, attorney for the National Cellular Resellers Association (NCRA), which in 1988 petitioned the FCC to halt the bundling openly conducted by cellular providers.

"How does the commission distinguish the bundling rule in cellular from any other market?" Wack asked. "If it's OK for the cellular carrier to bundle, then why is it not good for wire-line services, including the local exchange carriers?"

> "Cellular is far less competitive than the interexchange market," Wack said.

▲▲▲

Because of a lack of available spectrum, the cellular market is restricted to two carriers per market, known as the duopoly system.

The cellular market is largely unregulated, and none of the carriers are required to file tariffs except under the state-imposed rules of California, Florida and New York. With the FCC proposal to lift the bundling restriction, it may become even further deregu-

(continued on page 10)

FCC considers end to bundling ban

continued from page 9

lated. Although the market cannot hope to grow beyond two licensed providers per area under current technical limitations, the FCC said the cellular market was no longer in its infancy and had become competitive enough to consider lifting the bundling restriction (see graphic, page 9).

The agency acknowledged that the provision of free or discounted equipment by cellular service providers has become a widespread, publicly advertised practice — an incentive to sign up new customers.

FCC's Sikes claimed that consumers save $300 million annually through discounted equipment.

FCC sources later said that figure is a rough approximation that does not represent discounts obtained through bundling per se.

Opposing sides of the issue

Although the final text of the FCC's proposal isn't expected to be released for several weeks, it has already stirred controversy.

"Based on what we heard at the FCC, we disagree with the cellular equipment bundling proposal," said Edwin Spievack, president of the North American Telecommunications Association (NATA).

NATA has opposed bundling of long-distance services and customer premises equipment, saying the practice could hurt independent equipment manufacturers.

The Cellular Telecommunications Industry Association (CTIA), which represents licensed cellular carriers as well as equipment providers, expressed support for the rule change.

"Cellular customers always retain the right and ability to purchase equipment and service separately — in every market across the country," said CTIA President Robert Maher.

"Cellular telephone discounting is the essence of competition, providing increased choices and reduced prices to consumers," he said.

Greg Vogt, chief of the FCC's mobile services division, said the new rule "is not based solely on the state of competition in the market," noting that there are public interest benefits that could occur by getting customers in the system.

The FCC essentially must argue against the body of law it established, and, some would suggest, the Communications Act of 1934 as well.

Vogt emphasized that the FCC would move quickly on the matter.

The FCC intends to make a decision shortly after the 45-day time frame for public comment after the date of the order's release.

"We'll try to get it done as soon thereafter as possible," Vogt said.

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Industry Briefs

continued from page 9

technologies "that might not be seen in products for a few years or more."

Scott McNealy, president and chief executive officer at Sun, said the subsidiaries have been formed in an effort to better focus the company's resources.

Northern Tel restructures. Northern Telecom, Inc. recently announced a management reorganization designed to realign the company's geographic setup and product lines to better meet customers' needs.

Under the reorganization, the switch maker's Northern Telecom World Trade organization, formed in 1988, will be divided into two operating units: STC/Northern Telecom Europe in London and Northern Telecom Asia/Pacific in Tokyo.

Northern Telecom World Trade will operate alongside two other divisions: Northern Telecom U.S. and Northern Telecom Canada.

In addition, Northern Telecom is concentrating its resources into three main new global product groups: Northern Telecom Public Networks, which includes switching transmission and cable operations; Northern Telecom Private Networks, which includes private branch exchanges, key systems, data packet networks and terminals; and Northern Telecom Wireless Systems, which includes cellular products and personal communications systems.

Acquisition to help Telebit market wares

continued from page 9

market research firm Gartner Group, Inc., said Telebit is wise to be "leveraging its modem expertise in getting into the LAN market."

Modems, he said, "are not the real hot part" of the communications equipment market, whereas the local-area network market "is growing exponentially."

Larry Cynar, an analyst at Dataquest, Inc., a San Jose, Calif.-based market research firm, agreed. He pointed to Hayes Microcomputer Products, Inc.'s recent foray into the network operating system market as an example of another modem maker with a diversification strategy.

"I think Telebit's acquisition is typical of what we'll see in the next couple of years," Cynar said. "Modem makers are looking to diversify, which could mean that they'll start buying up small LAN equipment and application firms."

TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

Pacific Bell said the average holding time for live interactive 900 and 976 calls is five minutes, while the holding time for recorded data is 3½ minutes. Twenty-seven percent of California 900 lines are used for live programs.

Carrier Watch

US West Communications, Inc. last week began what it claims is the industry's first market trial of caller identification with name and number display. The trial will involve 70,000 residential and small business customers in Boise, Idaho.

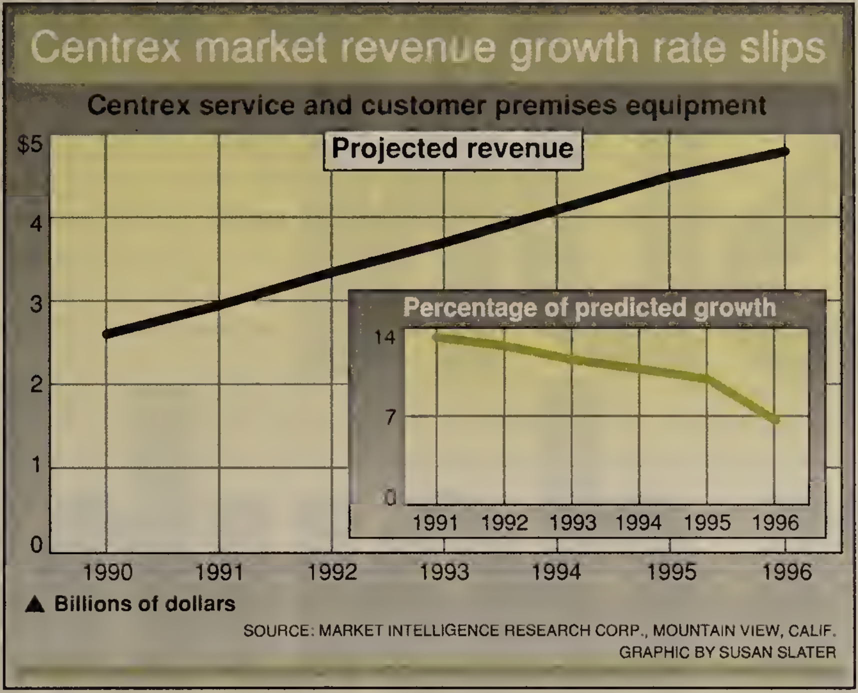
Regional Bell holding companies have introduced caller ID in the past but not with name display. With name display, US West Communications' Signaling System 7 network is used to transport the caller's telephone number and name from a network data base to the called party, where it is displayed on a telephone LCD or adjunct display unit.

The Bell operating company is offering customers in the six-month trial the option of blocking transmission of their telephone number and name by dialing "*67" before the called party's phone number.

The trial will provide US West Communications with information about the market demand for the service. The carrier will conduct customer surveys, focus groups and telephone interviews throughout the trial.

The BOC will charge a monthly fee of $5.95 per residence and $9.95 per business for Caller ID Name and Number. US West Communications said it hopes to begin deploying caller ID and five other Custom Local Area Signaling Services in August.

Caller ID subscribers will need a special telephone set or an adjunct unit in order to display the caller's name and number.


Centrex market revenue growth rate slips

SOURCE: MARKET INTELLIGENCE RESEARCH CORP., MOUNTAIN VIEW, CALIF.
GRAPHIC BY SUSAN SLATER

Deregulation theme of Bush proposal for telecom mart

Favors sale of radio bandwidth, rescinding MFJ.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — President Bush proposed radical regulatory changes for the telecommunications industry in the annual economic report he recently sent to Congress.

The report, compiled by the president's Council of Economic Advisors, proposes that the government lift all of the Modified Final Judgment restrictions on the regional Bell holding companies.

The report also suggests that the Federal Communications Commission change its current practice of licensing radio spectrum in favor of auctioning radio bandwidth to the highest bidder.

The report, essentially a policy paper from the White House, provides insight into the Bush administration's perspective on areas such as banking, health care and telecommunications.

For the latter, the report suggests that deregulation is the way to go. "Deregulation is a natural experiment that demonstrates the benefits of increased flexibility and the hidden costs of regulation," it states.

Part of the experiment advocated by the White House would be to lift the long-distance restrictions on the RBHCs, as well as the information services and manufacturing bans, noting "there are reasons to believe the local telephone companies might have much to offer these markets."

The report also supports the concept of price cap regulation — referred to as incentive regulation — over rate-of-return regulation for monopoly carriers.

The report says the price cap scheme is designed to preserve the overall relationship between prices and costs while severing or limiting the relationship for specific investments.

Radio spectrum

The White House proposal to alter the traditional spectrum management method used to allocate radio frequencies challenges the long-held policy that spectrum is essentially a resource to be granted on a free "loan" basis to licensees.

Radio frequency spectrum has become a valued commodity due to rising demand and its limited availability.

> The report supports price cap regulation over rate-of-return regulation for monopoly carriers.

▲▲▲

The Bush administration wants to sell off the spectrum to the highest bidder.

"Without the force of competition, spectrum bands are not necessarily used in ways that generate the greatest social value," the report stated. "The invention of new technologies is stifled because of the inability to get access to the spectrum, and there is an inadequate incentive to refine existing technologies to conserve the amount of spectrum used."

The report continued, "If instead of assigning spectrum

(continued on page 13)

US Sprint will offer free T-1 monitoring

Program will track performance of customers' ESF-based T-1s and identify circuit degradation.

By Bob Wallace
Senior Editor

ATLANTA — US Sprint Communications Co. is expected to announce next week a program under which it will monitor the performance of extended superframe format (ESF) T-1 lines free of charge.

With the Clearline ESF Monitoring Program, technicians at US Sprint's Network Control and Management Center here will remotely track performance of customers' T-1 lines and inform them of circuit degradation.

"Use of ESF will enable our technicians to quickly isolate faults, minimize outage time and improve the quality of our Clearline [T1.5] service," said Greg Crosby, private-line services group product manager for US Sprint.

ESF is an advanced T-1 framing format that enables carriers and users to monitor T-1 line performance from computer-based systems linked to channel service units (CSU) without taking the lines out of service.

ESF supersedes the superframe D4 framing format, which required carriers and users to take T-1 lines out of service for testing.

With the D4 framing format, 8K bit/sec of bandwidth on a 1.544M bit/sec circuit is used for frame synchronization and signaling. Advances in digital signal processing techniques have made it possible to perform the same function with one-fourth the bandwidth, leaving 6K bit/sec for circuit management data.

ESF enables users to spot circuit quality degradation before a circuit fails by accessing error data collected in the registers of their CSUs.

With the new program, US Sprint will be able to perform the same task from a series of networked Sun Microsystems, Inc. workstations here that poll line monitoring units (LMU) at

(continued on page 13)

WASHINGTON UPDATE

BY ANITA TAFF

Group may act against Florida PSC. A group of users and vendors that are trying to stop the efforts of the Washington, D.C. Public Service Commission (PSC) to regulate enhanced services may also try to stop a similar effort in Florida.

Earlier this month, a group of 16 parties filed a petition with the Federal Communications Commission asking the agency to stop Washington, D.C. regulators from imposing rules on enhanced service providers ("FCC urged to block D.C. regulatory move," *NW*, Feb. 18).

The group included organizations such as BT Tymnet, Inc., the California Bankers Clearing House Association, Digital Equipment Corp., MasterCard International, Inc. and Visa USA, Inc.

Now some members of that same group may file a supplemental document with the FCC asking the agency to step in and stop the Florida PSC from regulating enhanced services there, said a source who requested anonymity.

The users are concerned that many firms relying heavily on network services to conduct business, such as financial and insurance companies, may fall under the local regulations. They claim that local regulators have authority only to impose rules on carriers, not users.

The wrangle over enhanced services was prompted by a court ruling last year, which overturned the FCC's Third Computer Inquiry decision.

The court said the agency had overstepped its authority by attempting to regulate intrastate enhanced services.

The FCC is concerned that if states are allowed to impose

(continued on page 13)

Up to now, ISDN had a double standard.

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US Sprint to offer free T-1 monitoring

continued from page 11

digital access and cross-connect systems in the US Sprint network, Crosby said. The LMUs in turn poll carrier and customer CSUs attached to the T-1s.

However, US Sprint has not deployed ESF CSUs throughout its network. Beginning March 1, the carrier will ask new Clearline T1.5 Service customers whether they would like D4 or ESF used on their lines and will install ESF-compatible CSUs on the interoffice segment of the link when customers choose ESF, Crosby said.

When US Sprint technicians here detect intermittent failures, a short-duration service impairment, or a soft failure, the continued deterioration of circuit quality, they will alert the user within an hour.

Soft and intermittent failures generate exception reports that technicians use to identify circuits and isolate faults. Hard failures such as service outages generate trouble tickets, Crosby said.

Using these resources, a technician at the US Sprint facility here works with the customer to determine the cause of the problem, be it customer premises equipment, the local exchange portion of the link or the interoffice segment of the T-1.

According to Crosby, the combination of increased reliability and decreased price is the top factor when purchasing T-1 lines. "Users are focusing more on service reliability and less on price when they decide which carrier to buy their T-1s from," he said.

US Sprint is the last of the top three carriers to offer ESF monitoring on T-1 lines. AT&T began using ESF to monitor T-1s in the early 1980s, and MCI followed in 1988. None of the carriers charge for ESF monitoring.

Analysts applauded US Sprint's decision to offer the monitoring service but said the carrier must do more in terms of delivering ESF data before customers can really benefit from it.

"Although ESF itself is important, the real value added is how the carrier acts on the information and if it is presented to the user in the form of reports," said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy specializing in virtual networks.

US Sprint will begin offering ESF customers monthly T-1 performance reports in the second quarter, Crosby said, but the carrier has not decided if it will charge for these reports. Of the three carriers' network management services, only AT&T's Accunet Information Manager can be preprogrammed to respond automatically to certain ESF information and take corrective action, Briere noted. ◘

> "Although ESF itself is important, the real value added is how the carrier acts on the information," Briere said.
>
> ▲▲▲

Washington Update

continued from page 11

their own regulations, there will be a different set of rules in every state and the District of Columbia, making nationwide provision of enhanced services almost impossible.

AT&T recalls Tariff 15 offer. AT&T has withdrawn a Tariff 15 deal it filed for The Dun & Bradstreet Corp., which would have given the firm a 10% discount on Software-Defined Network Expanded Volume Plan.

The deal would have guaranteed Dun & Bradstreet that its rates would not increase during the three-year term of the contract. AT&T had said the offer was in response to a similar deal proposed by MCI Communications Corp. AT&T did not explain why it withdrew the deal. ◘

Deregulation theme of Bush proposal

continued from page 11

rights administratively, the federal government auctioned them off to the highest bidder and permitted their sale and reassignment, the flexibility of the telecommunications sector would be increased."

The report specifically mentioned that spectrum allocated to the government should be sold when the decision to sell it to the public sector is made.

The ideas in the report are likely to be picked up and promulgated by agencies that have some power to act on them.

The views on spectrum, for instance, were recently touched on by officials from the Department of Commerce's National Telecommunications and Information Administration in regard to legislation currently in Congress that would take 200 MHz of spectrum away from the government. ◘

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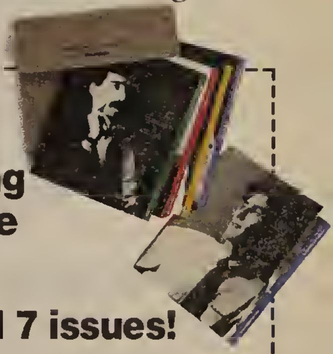

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PC WEEK High-speed Modem Product Review / November 19, 1990

PC WEEK LABS	ANALYST'S SCOREBOARD					
	Digicom Systems Inc. 9624LE+	Hayes Microcomputer Products, Inc. Hayes Ultra 96	Microcom Inc. QX/4232hs	Multi-Tech Systems Inc. MultiModem V32	Universal Data Systems, Inc. FasTalk V.32/42b	U.S. Robotics Inc. Courier V.32
1. Price / Performance	●	◒	◒	◒	◒	◒
2. Support of Older Modems	●	●	●	●	●	●
3. V.32 / V.42bis Compatibility	●	●	◒	○	○	●
4. Overall Performance	●	●	●	●	●	●
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DATA COMMUNICATIONS

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Worth Noting

"We're looking for vendors to provide information on how they will support frame relay. It's not something we need right away, but it definitely has some advantages over what we have today."

Rick Higgins
Senior vice-president of
telecommunications services
Security Pacific Automation
Company, Inc.
Glendale, Calif.

Data Packets

CLEO Communications last week introduced terminal-emulation software that lets a Unix-based workstation appear to an IBM host as an IBM 3278 or 3279 terminal.

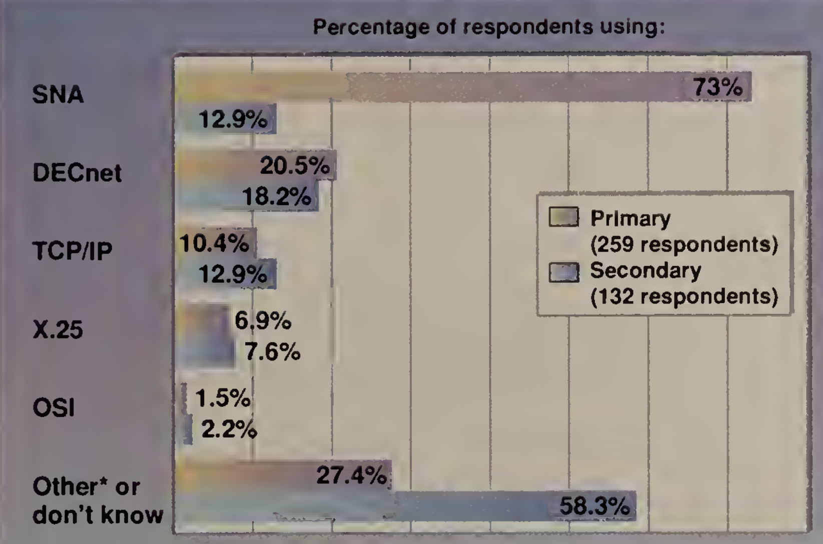
The Interface Systems, Inc. division said its 3270LINKix can be loaded into memory on CLEO's or IBM's advanced coaxial adapter boards, which reside in the Unix workstation. Either coaxial board links the Unix workstation to a local IBM 3274 or 3174 cluster controller via coaxial cable, while the software can operate in Control Unit Terminal (CUT) mode supporting a single-emulation session or Distributed Function Terminal (DFT) mode supporting five concurrent sessions.

The 3270LINKix software also enables ASCII printers attached to the Unix workstation to appear to the IBM host as an IBM 3287 printer. It also supports IBM's High-Level Language Application Program Interface (HLLAPI) Version 3.0. HLLAPI enables programmers to write applications that transparently initiate terminal-emulation sessions when host data is needed.

The 3270LINKix software with a CLEO coaxial adapter board supporting CUT mode costs $1,495, while the software and CLEO coaxial adapter board supporting DFT mode

(continued on page 18)

SNA dominates backbone net traffic



Figures are based on a survey of 259 MIS managers. Percentages exceed 100 because of multiple responses.

* Includes protocols such as Novell, Inc.'s NetWare, BSC, asynchronous, Ethernet and token ring.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MASS.

DRN to cut costs by buying long-haul service from Visa

Move saves radio firm from maintaining backbone.

By Jim Brown
Senior Editor

VIENNA, Va. — Fledgling local exchange bypass service provider Digital Radio Networks, Inc. (DRN) recently said it will acquire long-haul transmission services from Visa USA, Inc. instead of maintaining its existing X.25 backbone network to interconnect its regional data radio systems.

The agreement may lower transmission costs for some users that employ DRN's services to support on-line credit card authorizations.

Under the agreement, DRN will link radio systems in about 50 metropolitan areas across the country to Visa's VisaNet network. This eliminates the need for DRN to maintain and expand its existing backbone network, which comprises 13 regional X.25 packet switches.

"We could never support the same type of advanced backbone network as Visa does," said Stewart Dougherty, DRN's executive vice-president. "We're now able to concentrate on what we're best at, which is providing local radio service." DRN provides local data services using broadcast radio technology.

The agreement could be a boon for small and midsize merchants looking to lower the cost of obtaining on-line credit card authorizations. Dougherty said abandoning DRN's backbone in favor of paying Visa for backbone services will cut DRN's communications budget by about 40%, thus enabling it to keep the cost of its radio service below the price for comparable local exchange carrier dial-up services.

DRN supplies radio transceivers that use a proprietary protocol to transmit at 4.8K bit/sec data from merchant's credit card reader terminals to a master radio base station within a 15 mile radius. Currently, that base station is linked via 9.6K bit/sec leased lines to one of DRN's 13 X.25 packet switches. Those switches are in turn linked via 9.6K or 56K bit/sec leased lines to credit card authorization service providers including Visa, MasterCard International, Inc. and American Express Co.

Because DRN's radio base station continuously polls remote transceivers, its radio system emulates a leased-line connection. Broadcasting at 928 MHz or 952 MHz, DRN's radio system enables merchants to receive credit card authorizations in roughly six seconds.

This is as much as four times faster than the 24 seconds it takes to receive credit card authorizations using dial-up facilities.

DRN services also cost between 10% and 50% less than local carrier dial-up facilities, according to Dougherty.

While DRN will use VisaNet for transmission services, it is free to market its radio system to other credit card authorization service providers including Visa competitors MasterCard and American Express. Those companies can then resell the service directly to merchants or to banks that in-

(continued on page 18)

Unisys tools provide for co-op processing

Products enable users to split up applications, run parts on MCP/AS and OS/2 or Unix systems.

By Paul Desmond
Senior Editor

BLUE BELL, Pa. — Unisys Corp. last week announced the Cooperative Computing Environment (CCE), software that lets OS/2 and Unix workstations access data from network-attached A Series mainframes and aids users in developing cooperative processing applications.

Unisys also introduced the Unisys Cooperative Computing Platform (CCP), a dual-processor desktop system that is the first hardware platform approved to run the software.

CCP has both an A Series mainframe processor and a 33-MHz Intel Corp. 80386 microprocessor, so it can run the mainframe MCP/AS operating system concurrently with either OS/2 or Unix.

The combination of CCP and the new CCE software lets users create and execute cooperative applications that have one portion running under MCP/AS and the other under OS/2 or Unix.

Unisys said there is no technical reason why the CCE software can't run on Unix, OS/2 and A Series machines other than the CCP. The CCP is the only hardware for which the software has been tested and approved, however, according to Mark Feverston, program marketing manager at Unisys here. Tests for other hardware platforms are under way.

The CCP is based on a personal computer AT bus that can support interfaces for most types of local- or wide-area networks. This means that even remote A Series hosts as well as Unix and OS/2 machines can participate in cooperative processing environments.

The combination of CCP and CCE lets users create and execute cooperative applications.

▲▲▲

Conversely, the hardware and software combination can be used simply to give LAN-attached Unix and OS/2 users access to files and services supported by network-attached hosts. The reverse is also true in that A Series users can access OS/2 and Unix resources. The OS/2 software supplied by Unisys includes a facility through which users can access DOS machines.

(continued on page 20)

Systems Center, Fujitsu to link net mgmt. systems

By Paul Desmond
Senior Editor

TOKYO — Systems Center, Inc. and Fujitsu, Ltd. recently announced an agreement to develop a link between their integrated network management systems, a move that will give Fujitsu's system support for SNA networks.

The network management link will enable users with IBM and Fujitsu mainframes to manage both environments from a single management system.

The project also promises to give Systems Center's Net/Master control over network resources supported under Fujitsu's Corporate Network Management System for Information Processing Subsystem (COMS-I).

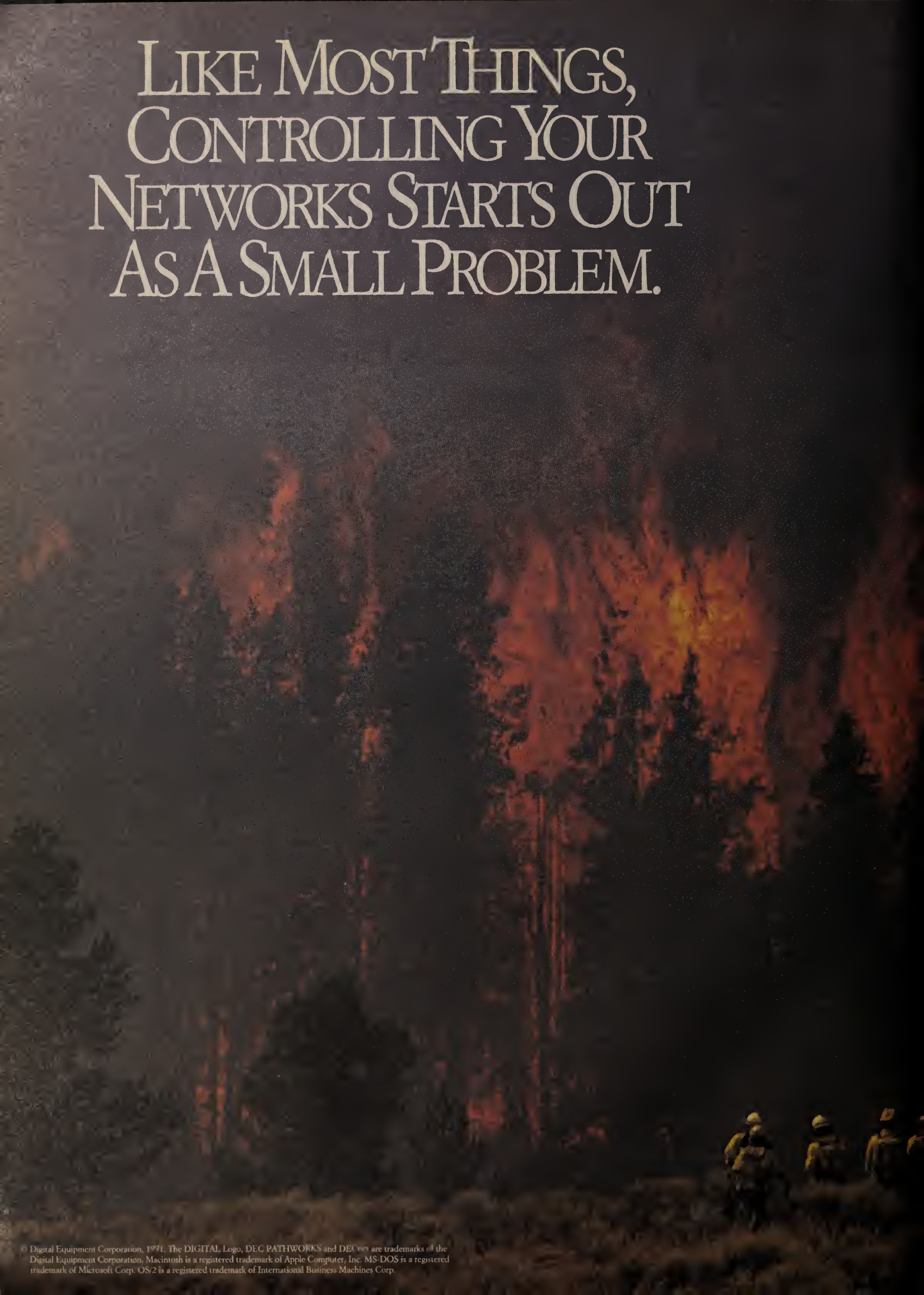
COMS-I controls Fujitsu mainframe information processing subsystems, which are analogous to CICS or TSO for IBM mainframes. It also includes COMS-C, which manages Fujitsu's communications products.

Net/Master is the leading alternative to IBM's NetView for managing Systems Network Architecture networks.

Michael Matthews, general manager of marketing for Systems Center in Sydney, Australia, said COMS-I will support the same application program interface (API) that is used for Net/Master applications, which are written using the Network Control Language (NCL), a fourth generation language.

"All Net/Master applications are written to an NCL API. We will build support in COMS-I for that

(continued on page 18)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DRN to cut costs, buy long haul from Visa

continued from page 15

clude it as part of their credit card authorization services.

However, all credit card authorization requests will first be routed across VisaNet to a Visa switching center capable of passing it to a Visa host or a competitor's network.

"Other [credit card authorization] processors can make DRN's service available to merchants," a Visa spokesman said. "But all the transactions will be routed across VisaNet first."

Visa is currently reviewing technical options for interconnecting DRN's base stations to VisaNet and hopes to have the links in place within six to nine months.

Currently, about 1,200 merchants nationwide are pilot-testing DRN's radio system. Those merchants receive credit card authorization services from a mix of vendors including Visa.

After Boston-based Fidelity Investments' recent acquisition of a controlling interest in DRN, the company has embarked on a strategy to increase its market share in key cities such as Baltimore, Chicago, Denver, Orlando, Fla., Miami, San Francisco, Tampa, Fla., and Washington, D.C. The firm will later seek to spread its presence in other key cities such as Atlanta, Boston, Dallas/Fort Worth and Los Angeles.

Data Packets

continued from page 15

costs $1,695. Both are available now.

AT&T Computer Systems recently announced that AT&T France received a multimillion-dollar systems integration contract to provide Euro Disneyland S.C.A. with a hotel reservation network.

AT&T said the contract is the largest systems integration project it has received from a foreign country but declined to divulge its value. Under the contract, AT&T France will install a pair of AT&T System 7000 transaction processors running reservation software developed by Anasazi, Inc. at Euro Disneyland's central reservation center in Marne La Vallee, France.

Local client workstations, as well as clients at remote reservation offices in Frankfurt, Germany, and London, will be tied to the System 7000s using AT&T communications software. France Telecom will provide the circuits feeding voice and data into the central reservation center, which will begin operation in March.

The network will enable customers to call into a Euro Disneyland agent to book hotels, campgrounds, restaurants and inquire about special events. Agents can also tap into a System 7000-resident data base for information about Euro Disneyland.

A Consultative Committee on International Telephony and Telegraphy working group met earlier this month in Fort Lauderdale, Fla., to continue work on an international standard dubbed V.fast, which will enable modems to achieve rates of 19.2K bit/sec or higher over dial-up lines.

The V.fast Rapporteur's Group of CCITT's modem standard-setting body, **Study Group XVII,** is working to define new standard modulation and data encoding schemes that will support 19.2K bit/sec or higher rates, said Steve Turner, a CCITT Study Group XVII committee member and manager of technical staff at Universal Data Systems, Inc. The Rapporteur's Group is also working to define a suite of tests it can use when evaluating various techniques submitted for consideration as the basis for the standard.

IBM/Europe, Motorola Information Systems, Racal-Milgo and Telebit Corp. have submitted technologies for the V.fast standard. Those technologies include an advanced trellis-encoding technique, new modem signal-shaping schemes and advanced adaptive channel equalization.

V.fast will be an improvement on the existing V.32bis draft, which lets modems operate at 14.4K bit/sec. V.32bis also includes a speed adaption feature, enabling a V.32bis modem that has switched to a slower operating speed to compensate for degrading line conditions to increase its speed once the line condition improves.

The V.fast Rapporteur's Group will meet again this May in Geneva.

Systems Center, Fujitsu to link

continued from page 15

API," Matthews said. "So applications written in NCL can work on COMS-I and use the facilities of COMS-I."

Fujitsu is the third major systems vendor with which Systems Center has announced an alliance since acquiring Net/Master marketing rights from Cincom Systems, Inc. The company also has struck net management alliances with Digital Equipment Corp. and Tandem Computers, Inc., plus one with AT&T that was forged by Cincom.

With the new API, Net/Master will work with Fujitsu mainframes running proprietary Fujitsu operating systems or the company's MSP and FSP operating systems, which are loosely analogous to IBM's MVS and VM, respectively.

The new software will run on the Fujitsu mainframe and is expected to be available in Japan in the third quarter of this year. Although worldwide availability dates have not yet been announced, Matthews said it will follow within six to nine months of the Japanese availability date. Pricing was unavailable.

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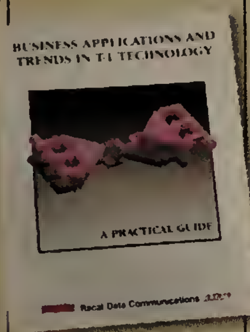
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Tools enable co-op processing

continued from page 15

"It's certainly an attractive piece of technology because it's all in one box," said Robert Kidd, an industry analyst with Dataquest, Inc. in San Jose, Calif. "It's an automatic way of going between the A Series and the Unix or OS/2 system that's almost transparent and trouble-free."

Feverston said users can choose to load either the OS/2 or the AT&T Unix System V operating system onto the CCP's 80386 processor. The Single-Chip A Series Mainframe Processor (SCAMP) in the CCP runs Unisys' MCP/AS operating system.

The AT bus provides the communications link between the two operating systems, Feverston said. The bus also supports peripherals that can be shared by the operating systems, including Small Computer System Interface tape or disk drives.

Unisys' new CCE software is what makes it all possible. It provides Unisys' own remote procedure call (RPC) technology to enable an application running under one of the operating systems to access the services of an application running under another operating system.

To accomplish that, Unisys will provide a simple library that an application programmer can use to develop cooperative applications, Feverston said.

For example, if an A Series programmer is writing an application that needs to access records stored on an OS/2 machine, he makes a call to that library and fills in the appropriate parameters to describe the record.

The Unisys software then performs the conversions necessary to send the request to the target operating system and retrieve the record. The programmer is thus spared from dealing with the communications aspects of that request.

The CCE library includes calls for many different types of network architectures and transports, including Systems Network Architecture, Transmission Control Protocol/Internet Protocol, Open Systems Interconnection, X.25, Ethernet and, soon, token ring.

Additionally, Unisys will provide a NetWare Requestor Kit that provides the application program interfaces required to let the CCE software participate in a Novell, Inc. NetWare LAN.

An example of how the CCE and CCP products can be used would be in an on-line transaction processing application that typically runs on an A Series mainframe, Feverston said.

With the new products, users can strip the screen-handling portion of the host application and instead employ an OS/2- or Unix-based graphical front end using the RPCs provided in CCE to link the two components of the application.

Alternatively, two existing applications can be connected using CCE. For example, a data base on a mainframe could be linked with a spreadsheet on a personal computer.

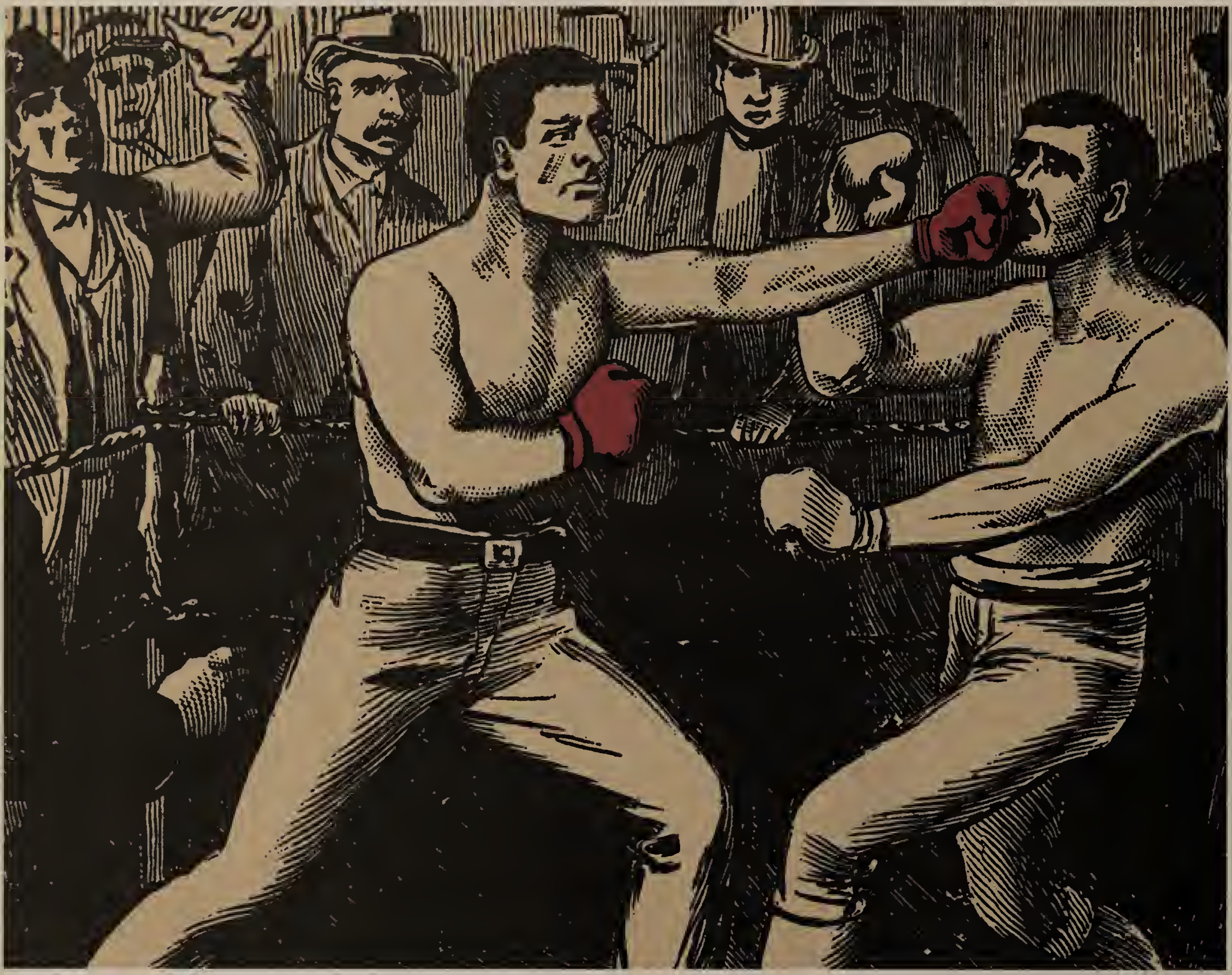
By itself, the new CCP hardware is an alternative to the IBM Application System/400 for users looking to upgrade from System/36 minicomputers, according to Feverston.

Unisys is offering software that can automatically port System/36 source code to the CCP and turn it into A Series source code. End users see the same application to which they are accustomed.

Both the CCP and CCE are available now.

Pricing for a combined CCP/CCE system begins at $26,750. ◼

> "It's an automatic way of going between the A Series and the Unix or OS/2 system that's transparent and trouble-free."
>
> ▲▲▲



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Worth Noting

"Novell has products to tie NetWare into IBM's mainframes. Stay tuned for mid-range [AS/400] connectivity."

Darrell Miller
Executive vice-president of marketing and services
Novell, Inc.
Provo, Utah

Netnotes

The **Association for Electronic Communication,** a nonprofit organization, has created a nationwide network to deliver mail faster than the U.S. Postal Service to the armed forces serving in the Persian Gulf.

With the MailStorm Project, messages are written to bulletin board systems around the country and forwarded to a central hub.

The hub then forwards the messages to the Saudi Connection, a network link between California and Saudi Arabia. Messages are printed out in Saudi Arabia and forwarded to the military post office.

The project was initiated by Bruce Heck, a computer reseller in Shawnee Mission, Kan. Heck is a Certified NetWare Engineer and a member of the Local Area Network Dealers Association.

Information about the MailStorm Project can be obtained by calling Heck, Kevin Johnson or John Rickey at (913) 236-5199.

Novell, Inc. has certified two vendors for their tape backup software: Cheyenne Software, Inc.'s ARCserve NetWare Loadable Module (NLM) and Tecmar, Inc.'s ProServe NLM.

Novell also announced that it will include B/R Device Interface with NetWare Version 3.11. B/R Device Interface, developed in conjunction with Cheyenne Software, allows Novell's Sbackup server-based application to work with more than 50 backup devices, according to Novell officials.

(continued on page 22)

User Alliance's Bud Huber urges users to be proactive

Hughes exec offers advice in NetWorld keynote.

By Caryn Gillooly
Senior Editor

BOSTON — In his NetWorld '91 Boston keynote address, User Alliance for Open Systems Chairman Bud Huber rapped users for not pushing for open systems and for failing to tackle issues of interoperability head-on.

In his presentation, Huber criticized users for taking a short-term view of network strategy and warned against complacency, explaining that users must constantly redefine their network missions.

Bud Huber

He said users must not lose sight of their primary goal, which is to "overcome the common barriers to achieving [an integrated] business information environment.

"There was a time not too long ago when users asked for tools that would help automate. Then they asked for tools that provided connectivity. Those tools are what they wanted, and vendors responded," said Huber, staff, corporate chief information officer at Hughes Aircraft Co. "But users don't really need automation or connectivity without interoperability."

Most users, he said, do not yet understand the need for real information systems interoperability and have not pushed vendors for products that support such interoperability.

One reason for this lack of understanding stems from short-term planning, Huber said. "American businesses claim to have long-range planning cycles. What that really means is getting through the next stockholders' meeting six or eight weeks down the road," he said.

Instead of looking at short-

(continued on page 23)

New Auspex SPARC server boasts high NFS throughput

By Caryn Gillooly
Senior Editor

SANTA CLARA, Calif. — Auspex Systems, Inc. has unveiled a new processor board for its family of Unix network file superservers it claims will provide the highest Network File System (NFS) throughput of any scalable processor architecture (SPARC)-based file server currently on the market.

The host processor board, based on a VME SPARCengine from Sun Microsystems, Inc., can perform more than 12 million instructions per second (MIPS), according to Auspex. The existing Motorola, Inc.-based processor boards in the company's NS 3000 and NS 5000 multiprocessor servers process two to three MIPS.

The new board will work in conjunction with Auspex's Functional Multi-Processor (FMP) architecture.

Typically, servers have general-purpose processors that must perform compute, NFS and other functions.

Auspex's FMP architecture separates the network, file and disk management functions typically performed by a server's CPU and allocates them to specialized processors.

Stepped-up performance

While general-purpose servers can dramatically slow a demanding application, the same application would run on its own processor in an Auspex server while NFS requests would be supported by another processor, thereby increasing network performance, Auspex said.

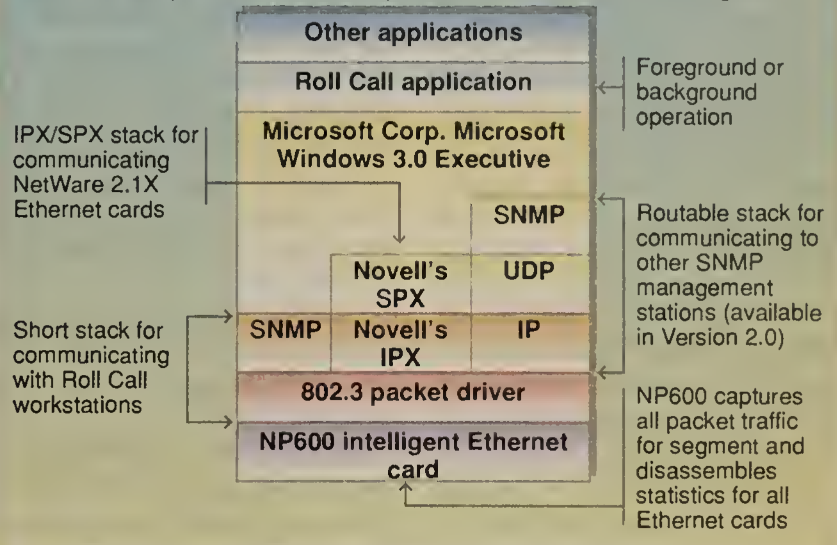
The new board will combine the FMP architecture that customers are currently using with a fast host processor, said John Dunham, product manager at Auspex, based here.

The SPARC enhancement will also give Auspex servers complete compatibility with SPARC

(continued on page 23)

Ethernet adapter management architecture

Roll Call product sees adapter cards without SNMP agents


Other applications
Roll Call application
Microsoft Corp. Microsoft Windows 3.0 Executive
SNMP
Novell's SPX
UDP
SNMP
Novell's IPX
IP
802.3 packet driver
NP600 intelligent Ethernet card
IPX/SPX stack for communicating NetWare 2.1X Ethernet cards
Short stack for communicating with Roll Call workstations
Foreground or background operation
Routable stack for communicating to other SNMP management stations (available in Version 2.0)
NP600 captures all packet traffic for segment and disassembles statistics for all Ethernet cards

IPX = Internetwork Packet Exchange
SPX = Sequenced Packet Exchange
SNMP = Simple Network Management Protocol
UDP = User datagram protocol

The first version of Roll Call supports Racal InterLan and Novell, Inc. NetWare adapter cards.

GRAPHIC BY SUSAN J. CHAMPENY
SOURCE: RACAL INTERLAN, BOXBOROUGH, MASS.

Multivendor Ethernet mgmt. tool offered

Product can manage Ethernet interfaces in SNMP and NetWare nets, will be upgraded for NDIS, ODI.

By Eric Smalley
Senior Editor

BOSTON — Racal InterLan, Inc. recently announced a Simple Network Management Protocol (SNMP)-based net management system that can be used to manage Ethernet adapter cards supporting Novell, Inc.'s NetWare Internetwork Packet Exchange (IPX) protocol or Racal InterLan's SNMP agent.

A subsequent version of Racal InterLan's Roll Call product is expected to manage Ethernet cards regardless of their manufacturer or whether they support SNMP.

Workstation adapters represent 90% of all network devices, according to Racal InterLan President Randy Phillips.

David Tolwinski, vice-president of marketing, said the new Roll Call product "will drive management down to the desktop."

Roll Call is a Microsoft Corp. Microsoft Windows 3.0-based application that allows network managers to control personal computer nets using a graphical user interface. The product is designed to create event logs and to allow network managers to view device status and network statistics in real time by clicking on an icon, according to Mark Bennett, personal computer product line director for Racal InterLan.

Roll Call's network map lets network managers view the network as a whole or focus on a particular segment. When viewing a segment, network managers can click on the icon of a specific node to view statistics.

Roll Call runs on a personal computer equipped with Racal InterLan's NP600 intelligent Ethernet processor, which captures and disassembles Ethernet packets on net segments. The NP600 forwards statistics to the Roll Call application.

Version 1.0 of Roll Call will include a dual-protocol stack running over a special Racal InterLan driver on the NP600. One stack supports an SNMP agent specific to Racal InterLan Ethernet adapter cards; the other supports Novell's IPX/Sequenced Packet Exchange (SPX).

Roll Call's map lets net managers view the net as a whole or focus on a particular segment.

▲▲▲

The SNMP stack allows Roll Call to manage personal computers equipped with Racal InterLan adapter cards, while the IPX stack lets Roll Call control the network interfaces in personal computers in NetWare environments.

NetWare device drivers cannot be linked to a multiprotocol agent, according to Bennett. To overcome this, Racal InterLan

(continued on page 23)

Novell, Microsoft battle over net operating systems

Firms offer pros, cons of NetWare, LAN Manager.

By Caryn Gillooly
Senior Editor

BOSTON — Representatives from Microsoft Corp. and Novell, Inc. dragged each other's operating systems through the mud during a session at the recent NetWorld '91 Boston conference.

The session, sponsored by the Local Area Network Dealers' Association, featured product managers and engineers representing both Novell's NetWare and Microsoft's LAN Manager.

Each group began by talking about the advantages of their own operating system. Novell touted its newfound connectivity with Apple Computer, Inc., IBM and Sun Microsystems, Inc. environments, while Microsoft praised its ease of use and its Microsoft Windows graphical user interface.

The session quickly digressed, however, into the familiar scrap about the speed and security of the respective operating systems.

The discussion was sparked by Brian Valentine, director of engineering at Microsoft, when he claimed that LAN Manager 386 was just as fast as NetWare 3.XX but offered a more protected, secure environment.

Valentine was talking about the ongoing criticism of Novell for its decision to write NetWare 386 as a protected-mode operating system; it is not based on a general-purpose operating system. LAN Manager, however, is based on OS/2.

Bill Redman, vice-president of Gartner Group, Inc. in Stamford, Conn., explained it as the classic Ring 0 vs. Ring 3 debate.

The Intel Corp. 80386 and 80486 architectures contain different memory management and protection layers, called rings. Ring 0 is the most privileged mode, generally where server-based applications are supported, while Ring 3 describes a hardware protected mode, generally where client applications are run.

LAN Manager, for example, is written to Ring 3 of the Intel architecture, which relies on the hardware to protect data integrity, operating system calls and so on. Novell's NetWare 386, on the other hand, is written to Ring 0. This means it was written as a protected-mode operating system, so Ring 3 protection has been written into the software.

Because the 386 version of NetWare was written at Ring 0, it gives the applications running under NetWare Ring 0 privileges, with the primary advantage being performance. According to analysts, a network operating system written at Ring 1 will be faster than one written at Ring 3.

> The session quickly digressed into the familiar scrap about speed and security.
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The primary disadvantage, however, is the sacrifice of server integrity. For example, because the application in LAN Manager has only Ring 3 access, it will not jeopardize server-based applications if a problem occurs. Performance is slowed because the processor has to reach across rings to perform tasks.

In NetWare, because applications have access to Ring 0, a problem with an application at the user workstation can conflict or cause a problem with a different server-based application. If the client application crashes, the server could crash as well.

"If an application doesn't behave, it could crash the whole system," said Lee Doyle, an analyst at International Data Corp. in Framingham, Mass.

Analysts agreed, however, that this is a religious argument. "This is like taking a stance of Coke against Pepsi," Doyle said, with Microsoft claiming it is just as fast and Novell claiming it is just as protected.

Analysts also agreed that this issue should in no way affect users' purchasing decisions. "Microsoft says the [NetWare Loadable Modules] running at Ring 0 are unprotected — [and] that's certainly true — but the potential for disaster has been blown far out of proportion," Gartner Group's Redman said. "OS/2 and LAN Manager can crash too, even with hardware protection." ◪

Netnotes

continued from page 21

Novell is also licensing client agents from Cheyenne Software that allow Sbackup to back up data from DOS, Microsoft Corp.'s Microsoft Windows, OS/2 and Unix client systems.

Alcom Corp. has released software that lets users send facsimiles from Microsoft Corp.'s Microsoft Windows 3.0 applications via LAN-based fax systems. The LanFax Redirector for Windows redirects print output from Microsoft Windows applications, converts the output to fax format and sends it from any fax on the network.

LanFax Redirector for Windows is managed by an application called Fax Manager.

Client systems on the network access incoming messages from the fax server, which maintains a log of received faxes.

In addition, LanFax Redirector for Windows is compatible with fax cards that support the Communicating Application Specification.

´ The software is available in eight-, 25- and unlimited-user licenses.

Pricing starts at $995. ◪

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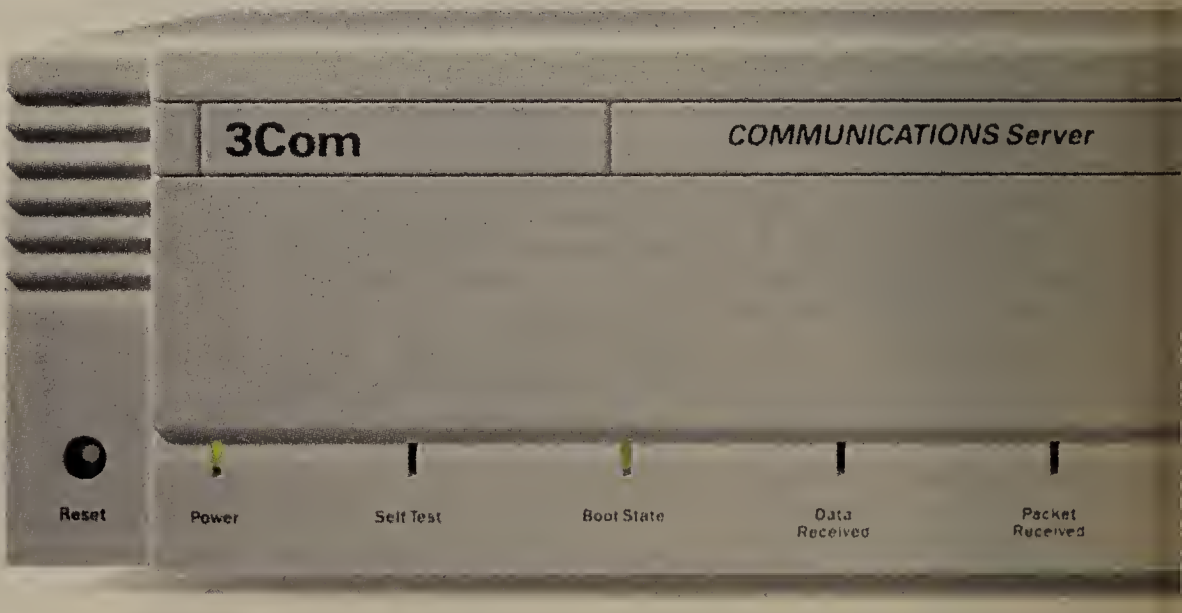

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Huber urges user proactivity

continued from page 21

term acquisition costs, as is the norm today, users should focus on long-term costs and benefits, and how much closer a particular solution will bring the user to interoperability.

Because of the short-term focus on product cost, Huber said, vendors get the wrong impression about what is most important to users. They work hard to bring down prices but do not provide the interoperability users really need.

"The single biggest shortcoming that I see in our movement toward open systems technology rests with users, not vendors," Huber said. "Vendors, for the most part, get their product development strategies through the feedback of purchase orders."

Anti-single vendor

Huber was harsh on single-vendor shops. "For those who believe that by being a single vendor environment they have shielded themselves or provided the requisite interoperability . . . you're absolutely kidding yourself," he said.

Huber stressed that even if a single vendor could provide the interoperability, "you jeopardize a strategic company resource by setting data up as a hostage to one vendor. Is that what you call good business? I call that 'risk' management.

"The mistaken belief [in] success through isolation to a single vendor can only result in leading a company down a primrose path toward rigor mortis," he said.

Huber urged users to work toward a modular information systems environment, in which interoperable components can be swapped out without major upgrades. "Such an approach enables [users] to protect their huge installed base of information systems, to upgrade components in a reasonably safe manner and to add new functionality as changing requirements dicate," he said.

Huber said vendors must support standards in order to play in this modular environment.

He urged users to take an active role not only in implementing change within their own environments but in supporting the overall mission of the networking community. He suggested that users and vendors become involved in groups such as the Corporation for Open Systems and X/Open, which focus on interoperability and standardization.

Huber concluded by saying that simply talking about implementing interoperable, standards-based networks and becoming a part of the overall push is not enough. "Like the Nike ad says: 'Just do it.' " ◘

> "The single biggest shortcoming that I see in our movement toward open systems technology rests with users, not vendors," said Hughes Aircraft's Bud Huber.
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Ethernet mgmt. tool offered

continued from page 21

added the IPX/SPX support to the Roll Call driver rather than rewriting the NetWare driver.

Instead of supporting SNMP agents for every vendor's Ethernet adapter cards, Racal InterLan will support cards that conform to the Network Driver Interface Specification (NDIS) and Open Data Link Interface (ODI).

Version 2.0 of Roll Call will add support for NDIS and ODI.

The Roll Call package includes the NP600, the Microsoft Windows-based interface and an SNMP agent. Version 1.0 of Roll Call will be available in April for $995. Users can upgrade to Version 2.0 free of charge.

Roll Call requires an Intel Corp. 80386-based personal computer, Microsoft Windows 3.0, 4M bytes of random-access memory and a hard drive.

For more information, contact Racal InterLan at 155 Swanson Road, Boxborough, Mass. 01719, or call (508) 263-9929. ◘

Server boasts high throughput

continued from page 21

workstation environments for the first time, according to the company.

Dick Bush, Auspex's vice-president of marketing, explained that in a financial analysis environment, for example, "you may have stock traders running applications on a SPARC workstation in the front room and software developers writing new SPARC-based applications in the back room.

"A centralized Auspex network server gives the traders the high I/O speed they demand," he continued, "while SPARC compatibility lets the developers mimic the traders' environment to test new programs, interfaces and so on."

SPARC-based Auspex servers, which will begin beta-testing next month, are scheduled to be available in May.

Server prices with the SPARC board installed will be set at $99,900 for the NS 3000 and $124,900 for the NS 5000. Prices are $10,000 less for the same models with the Motorola-based board. ◘

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Do you think Transmission Control Protocol/Internet Protocol represents a real threat to the development of open networks based on Open Systems Interconnection protocols?

"No. I think many users view TCP/IP as a steppingstone to OSI.

"It'll be a few years before we have a mature implementation of OSI that embraces the world. In the meantime, TCP/IP has become something of a de facto standard that a lot of users see as their transition path to the OSI model."

Rick Barron
Principal
McDonnell Douglas Corp.
St. Louis

"Yes, at least in university and government markets, because TCP/IP is firmly entrenched in both and it's reasonably well supported by vendors.

"We use TCP/IP extensively and have a massive investment in it, so we're not likely to migrate to OSI any time soon. As a matter of fact, our use of TCP/IP is growing rapidly."

Greg Scott
Computing services manager
College of Business
Oregon State University
Corvallis

"Yes, OSI will certainly develop much more slowly than it would have if TCP/IP never existed because it's hard to justify changing that large a base of networks and equipment.

"I think OSI will become the standard eventually. IBM has given OSI its blessing and that helps, but it'll be a long time before there is grand-scale usage of OSI in user networks."

Gary Henkel
Director of telecommunications
Time Customer Service, Inc.
Tampa, Fla.

"Yes. TCP/IP has become a de facto standard for multivendor interconnection, and users may be reluctant to alter their net and system architectures for OSI despite the long-term advantages of doing so."

Walter Sing
Assistant vice-president of information services
Technology planning
The First Boston Corp.
New York, N.Y.

On-line order entry system gives parts maker an edge

FACT system is a boon for Land Rover Parts.

By Maureen Molloy
Staff Writer

BIRMINGHAM, England — Land Rover Parts, Ltd., an automotive parts distributor, has achieved a real competitive advantage by providing its customers with a quicker and less expensive way to order parts.

The company's Fast Action Computer Terminal (FACT) system is an alternative to other suppliers' on-line order-entry systems, but FACT has been tuned to enable dealers to place orders and access information twice as quickly and at a lower cost.

FACT, which allows dealers to tap into Land Rover's host via a personal computer, helps the company outsell rivals pitching what are essentially similar products, according to Alan Simpson, Land Rover's managing director.

"Frankly, there isn't a lot to promote in our product since a clutch is a clutch. You can't put a lot of energy into saying my clutch is better than theirs," Simpson said. "Our distribution effort was the platform we used to establish a competitive edge, and communications technology was an essential ingredient of our strategy."

FACT is a CICS application residing on Land Rover's IBM 4381 mainframe. It processes more than 150,000 orders monthly from at least 150 dealers. Auto dealers access FACT from personal computers to place orders and determine order status, parts availability and account status.

In a typical transaction, a dealer's computer system will download a request for a part into a personal computer. The inventory request is then transmitted to Land Rover's system. Dealers also submit multiple-item orders in one transaction.

Forty dial-up ports are dedicated to dealer communications, and order information is delivered using an X.25 packet-switching network from Mercury Data Network Services, Ltd.

Dealers use Simware, Inc.'s

(continued on page 28)

GUIDELINES

BY ERIC SCHMALL

Net mgrs. should donate skills for community good

There is a time-honored tradition among many professional groups of contributing members' expertise and time to needy individuals or worthy community groups.

Attorneys, for example, do "pro bono" work in which they provide free legal service to individuals who can't afford it. Pro bono, short for the Latin phrase *pro bono publico,* means "for the public good." Also, physicians frequently offer their services to needy individuals or in emergency situations without worrying about monetary compensation.

Like physicians and lawyers, network managers possess special skills that they should consider donating to needy causes within their community. Net managers can easily offer groups advice about communications equipment and services, or help install a new system.

Consider a small community group that wants to set up a special office to collect clothing, support the homeless or provide special counseling to the indigent. Network managers can help such organizations analyze their communications needs, identify potential vendors, select the best system and negotiate a good price. Even larger, established charities may need assistance implementing such items as an 800 service, an automatic call distributor or a voice mail system.

This kind of assistance can be invaluable to many groups that do not have the money to hire a professional consultant. It also allows them to allocate more of their limited funds directly to charitable work.

(continued on page 28)

Schmall is a network systems manager for an insurance holding company.

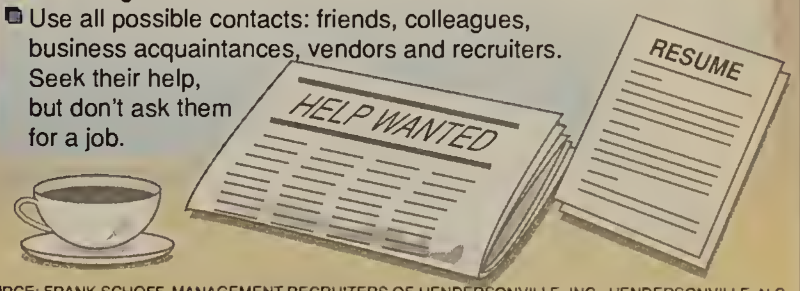
Surviving in today's tough job market

Advice for those currently employed:

- Understand where you stand in the company and how top management perceives your position.
- Don't assume that longevity or good reviews guarantee your job.
- Maintain a close network of contacts within the industry.
- Develop skills the company will need to fulfill its corporate objectives.

Advice for the unemployed:

- Keep meticulous records of all job-related phone calls, conversations and letters.
- Develop a resume that is action-oriented and based on accomplishments, not a rehashing of old job descriptions.
- If possible, conduct your job search from an office, not your house.
- Apply the principles of project management to your job search.
- Be willing to relocate.
- Use all possible contacts: friends, colleagues, business acquaintances, vendors and recruiters. Seek their help, but don't ask them for a job.



SOURCE: FRANK SCHOFF, MANAGEMENT RECRUITERS OF HENDERSONVILLE, INC., HENDERSONVILLE, N.C.
GRAPHIC BY SUSAN J. CHAMPENEY

Net execs face harsh reality of joblessness

Victims of downsizing, outsourcing struggle to find new opportunities in a tightening economy.

By Wayne Eckerson
Senior Editor

As a result of outsourcing, corporate downsizing and a souring economy, a significant number of mid- to high-level network managers have found themselves out of work and struggling emotionally as well as materially to make ends meet.

These days, it is not uncommon to hear about network executives with 10 to 20 years of experience who are drawing unemployment and unable to find a new job.

Some net managers are without work for a year or more — despite mailing hundreds of letters to recruiters and prospective employers, and expressing a willingness to relocate.

"I went through two or three months of deep depression, and it really shook my confidence," said Jack Sobish, a senior network analyst who was laid off from office furniture maker Hayworth, Inc. last April in a corporate downsizing program.

Sobish, who has 11 years of communications experience, was given four months notice as well as four months severance pay. Unfortunately, it took him a full year to land another job.

"Around June, with my severance pay running out, I had to confront the possibility that I would have to go on unemployment, sell my house, and move my wife, four kids and a dog into an apartment," Sobish said. "Emotionally, it was very difficult."

Luckily, Sobish landed a three-month consulting job to tide him over during the summer. Shortly thereafter, he received a job offer from Dow Corning Corp. in Midland, Mich., where he is now a net analyst helping to build a worldwide network.

> Despite 17 years of experience, Martin has been out of work for more than a year.

▲▲▲

Neil Martin lost his job as corporate telecommunications manager at an information systems subsidiary of an international manufacturing company in 1989 when his employer was acquired by an outsourcing firm.

Despite 17 years of experience, Martin has been out of work for more than a year. He was receiving unemployment benefits for 26 weeks until they ran out, and he has also done some freelance consulting.

"I thought it would take me three months to find a job," Mar-

(continued on page 28)

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occurs to me, what if the people who might get
signal from planet Earth aren't around when it
What if they're in a meeting? And the only
thinking this is because I'm on the tenth ring of the
this supplier when someone finally answers the
the ringing noise is ruining his lunch. He says,
message?" And I say, "Tell Ray he needs to work for a
AUDIX System from AT&T. Tell him 75% of all
reach their intended party on the first try. But with
missed. Tell him AUDIX features outcalling that can
important messages are waiting. And this is impor-
trying to reach him and they may not call back...."
there is intelligent life somewhere in the universe, it is

AT&T
The right choice.

On-line order entry system gives edge

continued from page 25

SimPC personal computer-to-mainframe connectivity and 3270 emulation software. Alan Stedall, Land Rover's information systems director, said SimPC runs help screens off-line on the dealer's personal computer, saving on connect time.

The system was optimized using Simware's SplitSecond software, which cuts overall response time to less than five seconds, a 60% reduction.

"Our closest competitor's fastest response time is 11 seconds, so dealers not only order parts more quickly from us but save a significant amount on connect costs," Stedall said.

Since implementing the software last year, Stedall said, the company has seen a $30 million increase in sales.

"Our distribution system wasn't solely responsible for our higher sales this year, but it has been one of the main reasons," he said.

According to Stedall, reduced session time saves dealers an average of $6,000 annually on network costs.

Simpson said the FACT system also enhances the company's competitive edge because it is easy for dealers to use.

"Dealers have high personnel turnover, so if a system is difficult to use, people won't take the time to learn to use it and it will end up sitting idle," he said. ◼

Net execs face harsh reality of joblessness

continued from page 25

tin said. "I never thought it would take this long."

Martin, who does not wish to relocate from Chicago, said he has written to more than 400 recruiters and Chicago-based companies but has only had one interview.

At this point, Martin has abandoned his job search and is working full time to establish a five-person consulting firm called Cameron Associates International. He said consulting will make better use of his skills, which include installing fiber and microwave networks and managing integrated voice and data communications.

Frank Schoff, president of Management Recruiters of Hendersonville, Inc., a Hendersonville, N.C., search firm specializing in networking, said there has been an increase in the number of displaced mid- to high-level network managers since the third quarter of last year.

He attributes this trend to the growing interest in outsourcing, the move to pare down management layers and general belt tightening due to the economy.

Moreover, Schoff said it is more difficult than ever for net managers to reenter the job market because most companies today prefer to hire individuals with expertise in specific technical areas, rather than generalists.

"Network managers are having a difficult time repositioning themselves as technical specialists," Schoff said.

Moreover, there is greater competition for the few managerial positions that become available.

Sobish, for example, said he faced competition from a host of network professionals who were laid off from AT&T, Drexel Burnham Lambert, Inc. and Northern Telecom, Inc. when he was searching for a job.

Silver lining

Despite the emotional shock that comes with a pink slip, some network administrators manage to see a bright side in losing in their jobs.

"It's given me a new opportunity in the middle of my career. Actually, it's been kind of fun," said one manager of communications services at a Fortune 50 manufacturing firm who requested anonymity.

The manager, who headed a seven-member staff, was notified six weeks ago that his job was being eliminated as part of a corporate reorganization. His staff, however, was retained.

The manager said he hasn't been entirely happy in his present position and looks forward to landing "a fun job." He is currently negotiating positions at several companies.

Despite his positive outlook, the manager did say he was caught off-guard when he was told his position was being eliminated.

"I hadn't put together a resume in 23 years, and I suppose I took my job for granted," he said. "There is no longer such a thing as job security in a large corporation." ◼

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Net mgrs. should donate skills

continued from page 25

Net managers should maintain contacts with community leaders and alert members of their networking staff when volunteer work is needed.

It is also important for net managers to set a good example for employees by showing their own willingness to lend time and expertise to community work.

However, it goes without saying that network managers should not make a practice of letting volunteer work interfere with business activities. In addition, managers shouldn't require staffers to volunteer or dictate what constitutes a worthy cause.

Overall, net managers who encourage participation in community service activities can add a rewarding dimension to network professionals' careers and inspire them to do even better work on the job. ◼

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

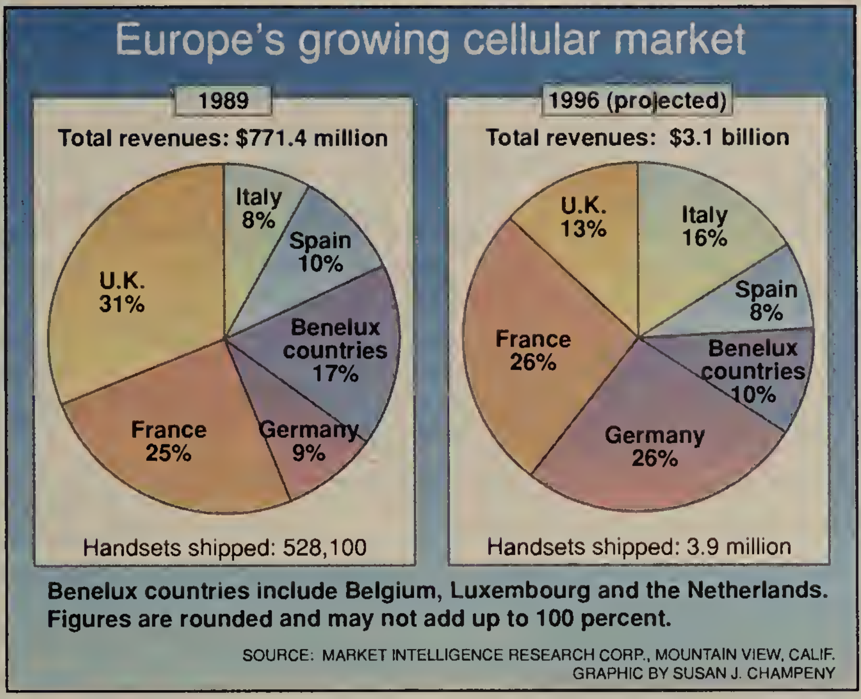
World News

AT&T last week began offering its International Accunet Digital Service — its fiber-optic private-line offering — between the U.S. and South Korea via undersea cables connecting the U.S. to Japan, and via the H-J-K cable, which connects Japan to Korea.

The service supports transmission speeds of 56K, 64K, 128K, 256K, 512K, 768K and 1.544M bit/sec. Service is available from 27 AT&T international points of presence, including Los Angeles, New York, San Francisco and Washington, D.C. The price of the service varies depending on transmission speed, gateway and contract terms.

Codetel, the main telephone service provider in the Dominican Republic, last week said it has agreed to purchase digital switching equipment supporting as many as 100,000 lines from AT&T Network Systems Group during the next three years.

The $20 million contract calls for AT&T to provide five 5ESS digital central office switches and installation services. The switches will initially support 30,000 lines by year end, with the remainder expected to be in service by 1993. The project is part of Codetel's network modernization and expansion program and calls for the switches to be installed at central offices in Herrera, the 30 de Marzo Complex, the Duarte Complex, Playa Dorado/Puerto Plata and in a new complex in the eastern part of the capitol city.


Europe's growing cellular market

Benelux countries include Belgium, Luxembourg and the Netherlands. Figures are rounded and may not add up to 100 percent.

SOURCE: MARKET INTELLIGENCE RESEARCH CORP., MOUNTAIN VIEW, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

Cellular firms poised to compete with PTTs abroad

Declining service costs threaten European PTTs.

By Barton Crockett
Senior Editor

As the movement toward a more liberal regulatory environment in Europe gains momentum, cellular service providers are likely to emerge as leading competitors to the continent's monopoly carriers, observers predict.

Analysts say that during the next decade, cellular service prices will decline significantly. Also, European regulators have so far been fairly lenient about allowing private cellular service providers to compete against monopoly post, telegraph and telephone administrations.

This contrasts with most other service markets in Europe, where competition is extremely limited.

"Cellular radio is the first alternative in Europe with its own infrastructure," said Derek Nicholas, European affairs manager in London with the International Telecommunications Users Group. "It attacks the very base of the PTTs' monopoly, which is voice telephony."

Nicholas is also vice-president for international telecommunications at Citicorp.

Much of the optimism about the future prospects of cellular providers stems from predictions about the rapid decline in service and equipment prices in the years ahead — a decline that is expected to fuel a dramatic increase in business.

> "Cellular radio is the first alternative in Europe with its own infrastructure."
>
> ▲▲▲

For example, the average price for a mobile telephone set in Europe is expected to fall from

(continued on page 30)

Soviet satellite group may join INTELSAT

Merger would benefit Eastern Bloc nations, but some fear INTELSAT-INTERSPUTNIK dominance.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — A Soviet satellite consortium may merge with INTELSAT, the U.S.-led international satellite consortium, said the top-ranking official of the Soviet organization at a recent conference here.

Users of international satellite services expressed support for the proposed merger, saying it would bring better services to Eastern Bloc countries. But some also expressed reservations that such a union could create a powerful consortium that might thwart competition for satellite services.

Boris Chirkov, INTERSPUTNIK director general, and John Hampton, International Telecommunications Satellite Organization deputy director general, confirmed that discussions are under way that may lead to a merger of the two satellite consortiums.

George McKendrick, executive director of the International Telecommunications Users Group (INTUG), said a merger would bring increased commercial satellite communications between the Eastern Bloc and the rest of the world.

But McKendrick added, "INTUG hopes the strong consortium that may emerge will not use its muscle to inhibit competition in the satellite field." He also said the development of competition to INTELSAT and INTERSPUTNIK is essential to users.

In the noncommunist world, the 120-member INTELSAT currently maintains a monopoly on international public switched satellite service. However, the consortium in recent years has eased its policy and allowed Pan American Satellite Corp. to carry private traffic, and it is considering further liberalization ("FCC urged to postpone rule about satellite competition," *NW,* Feb. 18).

In communist countries, the 15-member INTERSPUTNIK also operates as a monopoly, providing services to Cuba and other nations.

But as the Cold War has melted away, so too has the line between communist and noncommunist countries.

Last October, a united Germany joined INTERSPUTNIK, Chirkov said. Germany is also a member of INTELSAT. And last month, Romania joined INTELSAT, Hampton said, adding that Poland and Hungary, moving toward free-market economies, also want to join the group in order to increase its ties to the West.

The merger discussions initiated by the Soviets have been conducted for about a year, Hampton said. He added that INTELSAT has about 120,000 circuits, while INTERSPUTNIK has around 1,000.

As to the current Soviet views on a merger, Chirkov would only say, "The door is not closed, [but] it's not completely open."

Most observers say the merger would reap greater benefits for INTERSPUTNIK than INTELSAT. The U.S.-built INTELSAT satellites are widely regarded as superior to those of INTERSPUTNIK.

Participation in INTELSAT would give the Soviets greater ac-

(continued on page 30)

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Soviet satellite group may join INTELSAT

continued from page 29

cess to U.S. satellite technology, said Randall Kroszner, assistant professor of economics at the University of Chicago who has studied both consortia.

Neither consortium has publicly defined the terms or framework for the merger. But some observers suggest that a merger would give the Soviets an inexpensive membership in INTELSAT.

"Instead of putting up cash, they'll put up satellites," said one source who requested anonymity.

A merger could also result in greater hard currency revenue for members of INTERSPUTNIK. Last month, INTERSPUTNIK shifted from a payment system based on nonconvertible rubles to one based on hard currency, such as U.S. dollars and Swiss francs.

The hard currency crunch in the USSR is so severe that the Soviet Ministry of Communications has asked AT&T to lease circuits on INTERSPUTNIK to help alleviate the country's hard currency shortage. But because of both INTELSAT and U.S. government policies, AT&T is required to seek special permission from the U.S. Department of State, INTELSAT and the Federal Communications Commission.

AT&T is currently required to use INTELSAT circuits to carry satellite traffic from the U.S. to the Soviet Union, with AT&T and the Soviet Ministry of Communications splitting the cost of leasing INTELSAT circuits. Payment to INTELSAT is required in hard currency under INTELSAT rules.

Although they are facing a traffic overload, "the Soviets don't have sufficient hard currency to purchase further circuits," explained Charlie Meyers, AT&T's manager in international policy development.

Last fall, the U.S. State Department granted AT&T permission for unlimited use of INTERSPUTNIK private lines and as many as 100 switched circuits to handle traffic to the Soviet Union.

AT&T still needs INTELSAT and FCC permission for that usage. ◼

Cellular firms poised for PTT competition

continued from page 29

$1,461 in 1989 to $777 in 1996, according to Market Intelligence Research Corp. in Mountain View, Calif.

This decline will be fueled by the emergence of handsets that employ the new Cordless Telephone 2 digital telepoint technology.

Telepoint, often called the "poor man's" cellular telephone, is a new technology that allows users to purchase low-cost telephones enabling them to place outgoing calls within close range of a telepoint transceiver.

Cellular service prices are also expected to decline, according to Nicholas. Currently, cellular services are about three to four times more expensive than terrestrial network services. He predicts that within 10 years, cellular service will be comparable in price to the fixed services available from the PTTs.

Regulatory freedom

In addition, cellular telephone operators are enjoying a liberalization of the regulatory regime in Europe. For example, France currently allows a consortium of private companies, including Alcatel N.V., to operate a mobile telephone network in competition with France Telecom's cellular telephone service, Radiocom 2000. This represents the only voice service competition France Telecom faces.

Both France and Germany are licensing consortiums of private companies to build new digital cellular networks that will provide mobile telephone services in competition with government-owned carriers. And the U.K. already allows four separate cellular telephone systems and a handful of telepoint operators to compete in that country.

"The economics of mobile telephony will be such that in subsequent years, it will be quite competitive in price with fixed services," said Bryan Carsberg, director of the Office of Telecommunications, the U.K.'s principal regulatory agency.

Competition in the U.K.

As part of a major regulatory reform package now being debated, the U.K.'s Department of Trade and Industry has proposed that cellular and telepoint operators be allowed to compete fully with dominant carrier British Telecommunications PLC and rival Mercury Communications, Ltd.

Currently, British cellular and telepoint service providers must route traffic over British Telecom's or Mercury's terrestrial facilities to complete most calls. Under the new proposals, cellular and telepoint operators would be able to build their own terrestrial networks.

EC joins fray

Cornelius Berben, who heads up the European Commission's network access regulation division, said that over the next few years, commission officials will likely begin discussing new regulations that would force all 12 Common Market countries to allow competition in the cellular market.

But even though greater competition appears imminent, Nicholas warned that regulators may eventually attempt to pull back.

"You will see howls and screams from the fixed service providers as they try to scratch and claw back [their monopoly status]," he said. ◼

EDUCATION
DEVELOPMENT
FOUNDATION

The East-West Education Development Foundation, a not-for-profit foundation, is seeking donations of surplus personal computers and peripherals for placement in educational institutions in the USSR and Eastern Europe. The goal of the Foundation is to introduce information technology into the educational system of those countries evolving toward a democratic, free market society. By educating the students on the power of information technology, they will be better equipped to compete in the global market of tomorrow.

Information Technology Vendors:
Excess inventory donated to the East-West Education Development Foundation may earn an additional tax deduction*, as well as build market share for your brand in emerging markets.

Corporations:
As systems are upgraded to new technology platforms, East-West Education Development Foundation will place your old equipment where it will be used and valued. Your corporation may earn an additional tax deduction.*

Of special note:
The East-West Education Development Foundation will match computer donations to schools in the USSR and Eastern Europe with donations in the United States.

For further information, please contact:

The East-West Education Development Foundation
One Exeter Plaza, 15th Floor
Boston, MA 02116
Tel: (617) 542-1234
Fax: (617) 542-3333

*Under IRS Section 170(e)(3), corporations which donate their inventory (property sold in the normal course of business) to certain charitable educational organizations, receive an additional tax benefit. The deduction will be the total of (a) the donor's tax basis in the donated inventory, plus (b) one-half of the difference between the inventory's tax basis and its fair market value, (c) any incidental costs associated with donating the inventory, such as shipping, postage or warehousing.

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Xerox fax machine doubles as fax server

Xerox Corp. recently announced the **LAN/Fax Express 21,** a plain paper facsimile machine that doubles as a local-area network fax server for Novell, Inc. NetWare LANs.

Combining the Xerox Telecopier 7021 and its LAN/Fax Express hardware and software, the LAN/Fax Express 21 enables personal computers in LAN environments to generate faxes using pop-up windows from within existing applications.

Incoming faxes can be printed on the 7021, output to an optional dedicated laser printer or stored electronically in the the network file server. Faxes can also be sent directly to private mailboxes using push-button codes. LAN users can access a list of faxes in their mailboxes and then view, print, save, route, refax or delete them.

LAN/Fax Express 32 also enables users to scan documents into the net for storage in PCX graphics format.

The LAN/Fax Express 32 costs $6,995. Customers with a Xerox 7020 or 7021 fax machine can upgrade their machine for $2,995.

Xerox Corp. Xerox Square, Rochester, N.Y., 14644; (800) 832-6979.

UB enhances twisted-pair network interface

Ungermann-Bass, Inc. recently announced an enhanced version of its NIUpc/Ethernet on twisted pair (NIUpc/EOTP) network interface, a half-slot card that combines features such as on-board RJ-45 and attachment unit interface ports and 10BaseT compatibility with the original benefits of the NIUpc/EOTP.

The card offers an active network management agent that provides the ability to extend network management to the workstation. It also has protocol processor functions that off-load network tasks to the card's processor.

The card is expected to be available in March for $895.

Ungermann-Bass, Inc., 3900 Freedom Circle, Santa Clara, Calif. 95052; (800) 873-6381.

VMX voice system talks with DBMSs

SAN JOSE, Calif. — VMX, Inc. recently unveiled the VMX 300, a mid-range voice processing system that bundles call processing and voice messaging with the ability to interact with data base management systems.

VMX is positioning the device as a mid-range model in its line of voice processors, bracketed on the low end by the company's VMX 100 and VMX Dial systems and on the high end by VMX 5000.

VMX officials said the new model fills a gap between the VMX Dial and VMX 5000 systems, offering users configurations that cost as much as 25% less than similarly packaged VMX 5000 systems.

The VMX 300 supports 200 to 2,000 users, is expandable from four to 32 ports and offers as many as 350 hours of voice storage.

By contrast, the company's VMX Dial system supports 25 to 750 users, is expandable from two to 16 ports and offers up to 44 hours of voice storage. The VMX 5000 serves from 750 to 5,000 users, is expandable from eight to 64 ports and offers up to 258 hours of voice storage.

According to David Ladd, executive vice-president of product development at the company, the VMX 300 comes in configurations with 18, 24 or 26 ports.

The VMX 300 can be used as a single system integrated with a private branch exchange or Centrex telephone system, or it can be linked to other VMX systems to form a multilocation voice processing network.

The VMX 300 supports VMXworks, an application program interface that lets users integrate the VMX 300's call processing and voice-messaging features with local and remote data base information.

The device also offers a range of call and message processing options, including Personal Assistance, which enables a user to forward a phone to another extension for personal call coverage; Adaptive Integration, which provides callers with information about the dialed party and also offers a list of options; and First-In, First-Out Queuing, which puts multiple callers on hold for the next available operator and informs them where they stand in the queue.

Susan Huntoon, an office assistant supervisor at The Human Services Agency of Merced County, Calif., and an early user of the VMX 300, said her company cut over to the new voice system in a single weekend. "It happened so smoothly, our employees hardly noticed," she said. "And because the VMX 300 uses the same commands as the VMX Dial system we previously used, we didn't have to retrain employees or explain the system to callers."

She said that about half of the agency's callers are now using the VMS 300 to direct incoming calls, significantly reducing the need for clerks to take messages.

Pricing for the VMX 300 ranges from $50,000 to $395,000, depending on the number of ports, as well as disk storage and software options. The product is scheduled for general availability in the second quarter of this year.

For more information, contact VMX at 2115 O'Nel Drive, San Jose, Calif. 95131, or call (408) 441-1144.

SynOptics intros low-end concentrator for 10BaseT

SANTA CLARA, Calif. — SynOptics Communications, Inc. recently announced a low-end, managed 10BaseT Ethernet concentrator that costs less than $200 per port.

The Model 2810 Managed 10BaseT Workgroup Concentrator, used in local-area networks wired in a star configuration, has 12 ports for unshielded twisted-pair wire links to workstations at distances up to 360 feet.

Each concentrator also has one attachment unit interface port that can be used to link the device to other 2810s via a variety of media.

The 2810 can be configured with an optional local load feature. It comes with a Simple Network Management Protocol (SNMP) agent, meaning it can be managed from any station running SynOptics' LattisNet Basic Network Management Software or any other third-party SNMP management station.

The device costs $2,395 — or $2,595 with the local load option — and will be available within 90 days, the company said.

Contact SynOptics at 4401 Great America Pkwy., P.O. Box 58185, Santa Clara, Calif. 95052; or call (408) 988-2400.

DG offers LAN-based office automation

New Open Systems Office wares enable users to create enterprise work groups of Unix servers, PCs

By Charles Bruno
Assistant Managing Editor

BOSTON — Data General Corp. recently took the wraps off a new office automation package that will enable DG users to migrate from proprietary environments to industry-standard local-area networks.

DG's Open Systems Office (OSO)/pc.DAA should lay to rest user concerns that the company's flagship Comprehensive Electronic Office (CEO) office automation software forced users into strictly using DG's proprietary equipment.

OSO/pc.DAA, by contrast, enables users to support DOS-based personal computers attached to DG's Aviion Unix-based servers running Novell, Inc.'s Portable NetWare. Users can access data on the NetWare servers or the company's older MV minicomputers running DG's CEO software.

OSO/pc.DAA is based on DG's Distributed Applications Architecture and provides users with electronic mail, file and print services, as well as application integration, according to Jerry Goguen, DG's manager of office systems.

"We're giving users the ability to create enterprisewide work groups that transcend traditional departmental boundaries," Goguen said. "The software enables a network administrator to classify certain users as part of a work group and designate to them LAN service privileges."

OSO/pc.DAA is an MS-DOS software package based on Microsoft Corp.'s Microsoft Windows 3.0 graphical user interface. The software also supports Hewlett-Packard Co.'s NewWave software, enabling it to manipulate data and applications.

For sharing resources such as file servers and printers, OSO/pc.DAA uses DG's NetWare for Aviion and Message Handling System (MHS) software.

Users install a client portion of the software on their LAN workstations and a server module on the Aviion servers.

The client code is basically a NetWare DOS requestor module coupled with MHS, Microsoft Windows and NewWave, issuing file and data requests across a NetWare LAN to a local server. The server component runs on DG's scalable line of Aviion computers.

The server comes with optional gateways to give DOS users access to CEO files on proprietary MV minicomputers.

According to John Rymer, a senior consultant with Patricia Seybold Office Computing Group in Boston, OSO/pc.DAA will primarily appeal to DG's CEO current users.

"The move is on to LANs, and CEO locked up users in proprietary minis," Rymer said. "This is a product that will let PC users on a LAN bridge a NetWare and CEO environment."

Rymer said DG previously offered CEO Object Office, a temporary fix that gave personal computer users access to data within a CEO environment. That gave only DG terminal and workstation users access to CEO files.

> "This is a product that will let PC users on a LAN bridge a NetWare and CEO environment," Rymer said.

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While OSO/pc.DAA is not likely to win any new customers for DG, Rymer said the announcement was a bold move because the software backs NetWare. Other LAN-based office automation software — including NCR Corp.'s Cooperation, IBM's OfficeVision/2 and others — supports Microsoft's LAN Manager.

One improvement of OSO/pc.DAA over CEO Object Office is that users' machines need no longer emulate DG terminals to access CEO data.

OSO/pc.DAA is scheduled to ship in May. Pricing for configurations without Microsoft Windows 3.0 range from $420 for a single-user license to $20,800 for up to 64 users. Packages that include Microsoft Windows software cost from $550 for a single user to $28,800 for a 64-user license.

For more information, contact DG at 4400 Computer Drive, Westborough, Mass. 01580, or call (800) 343-8842.

MANAGEMENT STRATEGIES

BY NATHAN MULLER

The role of chaos in coping with change

Change within the communications industry is multidimensional: It is sudden, fast-paced and omnidirectional. Yet if industry leaders are to respond effectively to the forces of change rather than be swept along by them, they must understand the essence of change and the impact it has on organizational structure and performance. The emerging study of chaos theory may facilitate this understanding.

Chaos theory offers new insights into the role of complexity in nature. Specifically, it is a way of seeing pattern and order where formerly only the random, the erratic and the unpredictable had been observed. It can aid in understanding such natural phenomena as the turbulence of wind and the flow of water. In addition, it is being used to discover patterns in vast amounts of economic data, which is helping to spot trends that previously escaped notice through conventional analytic methods.

When applied to the development and implementation of business strategies, the science of chaos may yield compelling insights. For example, one of the lessons of chaos theory is that as the external environment becomes increasingly turbulent, chance plays a larger role. Applying this lesson to the business environment poses a challenge to managers — how to position the enterprise to take advantage of unexpected change. Meeting this challenge involves three steps:

- **The company must find a way to detect that a change in the external environment has occurred.** This can be accomplished by formalizing the data collection process through such primary sources as salespeople, field technicians, new hires, outside consultants, user groups, suppliers and informal contacts with competitors at association meetings, standards organizations and ad hoc industry groups.
- **The company must set up a procedure to filter, process and distribute the information in a timely manner.** The compilers of the information must be careful not to flavor it with their own personal biases, which would make it less useful. This requires people with a rare blend of skills and experience.

The intuitive person knows how to process vast amounts of information by separating what's important from what's unimportant based on feel. The systematic person uses linear search methods and relies on logic to discover trends. Both types of people must be able to add value to the information based on their experience and expertise, and to recommend an appropriate course of action.

- **The organization must take effective action.** Because it encourages omnidirectional communications, a flat organizational structure is more conducive to the success of this project. By speeding the information flow in this way, the organization increases its capacity to respond to change.

Another lesson that the science of chaos teaches is that external pressures carry more weight and begin to impinge on established structures in completely new ways. Once these pressures are identified, the challenge for business is to respond appropriately. The organization must be flexible, which permits it to establish priorities and quickly reorganize resources to support new objectives.

At times, a hierarchical, top-down approach will be appropriate. Sometimes a flatter, decentralized approach will be needed. Conceivably, the same organization may even alternate between the two as changing circumstances dictate. Departments may blend together in support of a specific goal and then separate and recombine with other operating units of the organization in

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EDITORIAL

NW expands its network test series

Network World has always been proud of its objective examination of networking products, with the goal of helping readers make more informed purchasing decisions. We accomplish this through product coverage, our ongoing series of Buyer's Guides and product testing articles.

We have found that testing is of particular importance to our readers. Therefore, we are particularly proud to announce the expansion of our Local-Area Network Test Series to include products that work with networks other than LANs. We are also pleased to announce that we have selected Business Systems Group, Inc. (BSG) of Houston to conduct performance testing for us in 1991.

In keeping with the expansion of its subject matter, the test series has been renamed the *Network World* Network Test Series. The series will also be more sharply focused on how networking products work in conditions similar to typical business environments.

This task sounds simple, but actually many published product tests deliver raw throughput figures without examining the performance of the products as they are generally used in an enterprise network.

BSG is a rapidly growing systems integrator that specializes in helping users build enterprisewide networks. It has conducted thorough product and interoperability tests of network products for many Fortune 500 companies.

Testing for the series will be conducted in the laboratories of BSG's Enterprise Technology Center. In addition to having state-of-the-art testing facilities, the center serves as a showcase for multivendor networking.

Product testing for the first article of the 1991 series, multiprotocol local and remote routers, is already under way. The test results will be published in the features section in March or early April.

Future test series subjects will include client/server data base systems, LAN superservers and the interoperability of 10BaseT products.

We are committed to making the Network Test Series a simple, critical, objective and highly useful guide to product performance.

BSG shares these aims. Indeed, BSG President Steve Papermaster succinctly summarizes the test series' goal as being "to help managers make hard choices about building and maintaining enterprise networks." ◼

OPINIONS

MACROSCOPE

BY JAMES KOBIELUS

Virtual reality may transform future multimedia interfaces

Participants in a multimedia conference can see and speak with one another, exchange facsimile and electronic mail messages, and jointly create graphics and edit documents on shared computer screens.

Taken to its logical extreme, multimedia technology can serve as the basis for "virtual reality," a concept pioneered by the Massachusetts Institute of Technology's Media Laboratory and other research groups.

Virtual reality architectures almost literally invite users to step into the world defined by the system. Sophisticated I/O devices, such as touch screens, goggles, heads-up displays and data gloves, enable users to view and manipulate electronic information and images in three dimensions. These technologies allow engineers, for example, to redesign, rotate and juxtapose computer-aided design models on computer displays as if the models were physical objects.

Virtual reality technologies take metaphorical expressions that systems professionals use every day — such as "environment" and "object" — and transform them into quasi-literal descriptions.

The electronic environment merges with the user's day-to-day environment, and the electronic object behaves more and more like a material object. The distinction between information technology and the physical world we inhabit begins to dissolve. Used appropriately and not just as a gimmick, these technologies can truly redefine what it means for a network interface to be transparent.

Imagine extending an outstretched arm across a video map of the U.S., directing the system to zoom in on Southern California and then pointing at the image of your company's headquarters in Anaheim. This last action causes the system to display an organizational chart for that site, with each employee represented on the tree by a scanned photograph. Point to a particular picture and a high-definition, three-dimensional videoconferencing session with that person is established.

Or imagine how virtual reality can transform today's graphical user interface, such as Microsoft Corp.'s Microsoft Windows, NeXt, Inc.'s NextStep or Apple Computer, Inc.'s Macintosh.

> Virtual reality may be a bit too rich — and flaky — for the tastes of most companies.
>
> ▲▲▲

Nature's best pointing device — the human finger — takes the place of today's mouse. Users can pick up, open and scan on-screen file folders with the same deft hand motions they use on paper files.

This on-line world could obey the laws of physics and optics in which computerized objects diminish in size as they move to the background, cast shadows and make noise when they collide or brush up against one another. Such a world would feel familiar and livable to even the most technophobic user.

However, virtual reality may be a bit too rich — and flaky — for the tastes of most companies exploring multimedia for training, education, customer service and other applications.

Most multimedia systems for the foreseeable future will probably continue to use the trusty old human interface technologies: the keyboard, mouse and video display terminal.

One of the drawbacks of multimedia when accessed using these traditional interface devices is the potential for clutter as more and more types of information jostle for the user's attention.

Multimedia systems tend to overwhelm users with an embarrassment of electronic riches. Most place textual, graphical, animation and audio/visual objects in overlapping windows that scatter users' attention.

When too much information is displayed in a tight, two-dimensional frame, the mind tends to boggle.

If not designed with elegance and restraint, multimedia applications can resemble a bad art film — a bewildering sequence of apparently arbitrary sounds and images.

Designed well, however, multimedia applications can harness this complexity and have a stunningly positive effect.

The most important ingredient in multimedia application design — when virtual reality technologies are not available — is the ability to suggest the third dimension in the user's mind. Hypermedia applications often accomplish this by guiding users through a simulated 3-D, on-screen environment, such as through a stack of cards or across a landscape.

This simulated spatial interface becomes the conceptual focus of the entire application, from which complex information in assorted media may be accessed. For example, a multimedia electronic message may present the recipient with a simulated folding file — each compartment of which may be expanded to explore its varied contents.

The mind works best in three dimensions. The success of network and stand-alone multimedia applications depends on whether developers can create an on-line environment that appears solid and tangible to end users.

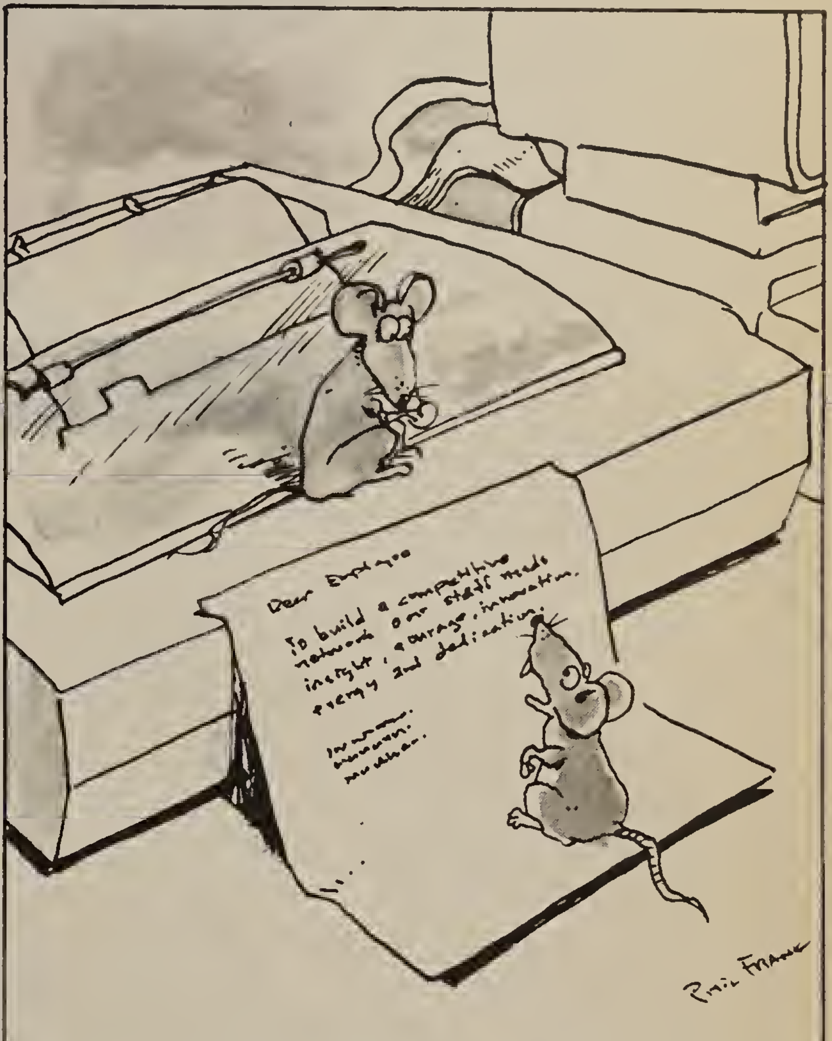
Kobielus, a contributing editor to Network World, *is a telecommunications analyst with Fairfax, Va.-based Network Management, Inc., one of the largest local-area and wide-area network systems integrators in the U.S.*

LIKE ALLIGATORS IN A SWAMP, unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, assistant features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

TELETOONS

BY FRANK AND TROISE



This memo says: "To build a competitive network our staff needs insight, courage, innovation, energy and dedication."... GEEZ,, FREDDIE!,, these people are in **big** trouble!!

LETTERS

Authors rebut review

Your review of *LANs to WANs: Network Management in the 1990s* ("Book on net management short on LAN advice," *NW,* Jan. 21) contained statements that may have confused readers about the nature and scope of our book.

The reviewer, Eric Schmall, claims that only 70 pages of the text cover LANs. Ignored was a whole chapter describing metropolitan-area networks, Fiber Distributed Data Interface, Switched Multimegabit Digital Service and other LAN extension methods. Even the chapter on private branch exchanges includes a discussion of local-area networking.

The book's index reveals that LANs are brought into numerous other discussions, in recognition of the fact that there's no longer a clean separation between LANs and WANs.

The reviewer also claims that the topic of network management receives little more than 30 pages. Actually, network management is covered in every relevant chapter and in terms most appropriate for the device or service under discussion: configuration management, fault management, performance management, accounting management and security.

For example, the chapter on data service unit/channel service units fully describes network diagnostics and fault isolation. Other chapters cover such management topics as static bandwidth management via a digital access and cross-connect system, network restoral and trunk-group restoral methods planned for AT&T's Software-Defined Data Network service.

The book is criticized for occasionally providing too much detail, as in describing

(continued on page 40)

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

Satellite networks

CONTINUED FROM PAGE 1

Gone are the days when users had to have pockets deep enough to own and operate their own master station. The large manufacturers and carriers now provide shared hub services in addition to equipment sales. A new group of systems integrators has entered the market, providing shared hub services on a regional basis for smaller organizations.

Then came 1991. Perhaps sensing new application opportunities, vendors became aggressive in pricing. The year has started out with new products from all the major satellite network suppliers. Both Hughes Network Systems, Inc. and Scientific-Atlanta, Inc. have announced low-cost VSAT units that bring pricing down to as little as $250 per month per remote node in quantities of 1,000 units.

Arst is president of Communication Strategies Associates, Inc., a Cupertino, Calif.-based consultancy that specializes in outsourcing, very small aperture terminal networks and wireless personal networks.

Additionally, Scientific-Atlanta has announced an extremely small private hub priced to compete with shared hub services. Hughes has sweetened its offerings with a local-area network interconnection service.

AT&T Tridom has announced several new product improvements, including a host interface disaster recovery service that provides complete backup of all major network components. It may be alternately routed to designated customer or commercial disaster recovery service hosts.

Also, GTE Spacenet Corp. has announced major network management augmentations, including a user-friendly graphical interface that runs on a Sun Microsystems, Inc. workstation. And Contel ASC is offering a virtual hub service that provides local access to its data network service in 50 metropolitan areas.

CHART • GUIDE

A Buyer's Guide chart comparing the offerings of various VSAT service providers is on page 38.

In addition, international operating capabilities have been enhanced. Companies can now implement transborder services to Canada and Mexico. And direct private satellite network links to South America and portions of Europe are also available.

With more than 35,000 VSATs installed, satellite transmission has proven its reliability. Now its vendors are concentrating on providing advanced capabilities and network management options.

Data, video, image, voice and audio applications are now supported over VSAT facilities. And with extensive network management and catastrophe backup capabilities deployed, VSAT ser-

take off

vices are now positioned to serve as a nonvoice corporate information distribution backbone.

Outsource your network

Procuring and operating a VSAT network is like outsourcing your defined set of communications needs. You will no longer need to deal with multiple carriers and equipment providers, and you don't need to become a do-it-yourself expert in still another technology in order to enjoy its benefits. Instead, the shared hub industry vendors offer a single source for the design, equipment, maintenance and full operation of your private network.

With VSAT services now widely available from carriers and service providers, what should you look for when evaluating them?

Typically, smaller networks — comprising 10 to 50 nodes — are handled by the smaller regional vendors, which are organized to support these networks and can devote their time to your specific application. Working with a vendor in your geographic region can provide more face-to-face support opportunities and lower host link costs.

The large carriers and manufacturers provide extensive software and systems customization capabilities. Your choice can well be driven by your need for vendor-specialized nondata services, such as video, or the vendor's operation of multiple satellites and multiple shared hubs to meet your specific catastrophe backup needs.

As feature differences between the various equipment manufacturers have become narrower, service has become the final — and most important — consideration when choosing a vendor.

Choose your cost structure

One of the most pleasant developments of 1991 thus far has been the introduction of a new generation of low-cost VSAT units. The vendors of these products claim users can expect costs of as low as $250 per month per remote node when purchased in quantities of 1,000 units.

Examples of these units are the recently announced Scientific-Atlanta SkylinX Express unit ("Downsized VSAT suited for low traffic at remote sites," *NW,* Jan. 28) and the Hughes Network Systems model PES 6000 ("Hughes new PES VSAT line offers range of models," *NW,* Dec. 10, 1990). They use smaller antennas (less than 1 meter) than the 1.8-meter antennas required by the current generation of VSATs. Therefore, users can place these units in many locations that might otherwise be visually objectionable, such as on buildings in urban areas.

But small size can be costly in performance. For

(page 36)

VSATs bring enhanced communications services and price options to networks of all sizes.

(continued from page 35)

example, the Hughes PES 6000 unit runs at lower channel data rates than its big brother, Hughes' PES 8000. In addition, the PES 6000 cannot support video or voice applications.

Support of these nondata applications, high data throughputs and forthcoming image transfers can best be obtained from the high-performance units currently supplied by all major VSAT manufacturers. And fortunately for users, the prices of high-performance units have gradually decreased to a current level of $350 to $450 per month for quantities of 1,000.

But users should beware of other cost factors. These typical price levels can be increased by the need for additional interfaces for video, multiple data services or high-volume data transfers.

Response time requirements are also an important cost factor. System costs can be increased 10% to 20% by the need for additional satellite bandwidth, host link ports and host link circuits in order to meet users' stringent response time requirements.

Catastrophe backup requirements can also add considerably to these base system costs. For example, an alternate host link to a second hub, network support by multiple satellites or autodial backup for failed remote offices will all add to the above cost structures.

> System costs can be increased 10% to 20% by the need for additional bandwidth, host link ports and host link circuits.
>
> ▲▲▲

The key point to keep in mind is that these classes of nondata services, response time and catastrophe backup capabilities would also add considerably to the cost of terrestrial solutions.

Users should perform an apples-to-apples comparison of equivalent capabilities when evaluating VSATs vs. terrestrial nets, as well as low-performance vs. high-performance VSATs.

Video comes of age

Broadcast video has become a particularly attractive option for VSATs. Video reception is virtually free when piggybacked on top of VSAT data service.

For as little as an additional $10 per month per remote node, you can add video reception capabilities. Private training sessions can then be conducted on an ongoing basis, resulting in travel cost savings.

An example of this trend is the implementation of video capabilities by Chrysler Corp., General Motors Corp. and several foreign automobile manufacturers. More than 15,000 dealers will have the facilities to receive product announcements, sales and service training, as well as other programs, directly from the auto manufacturers.

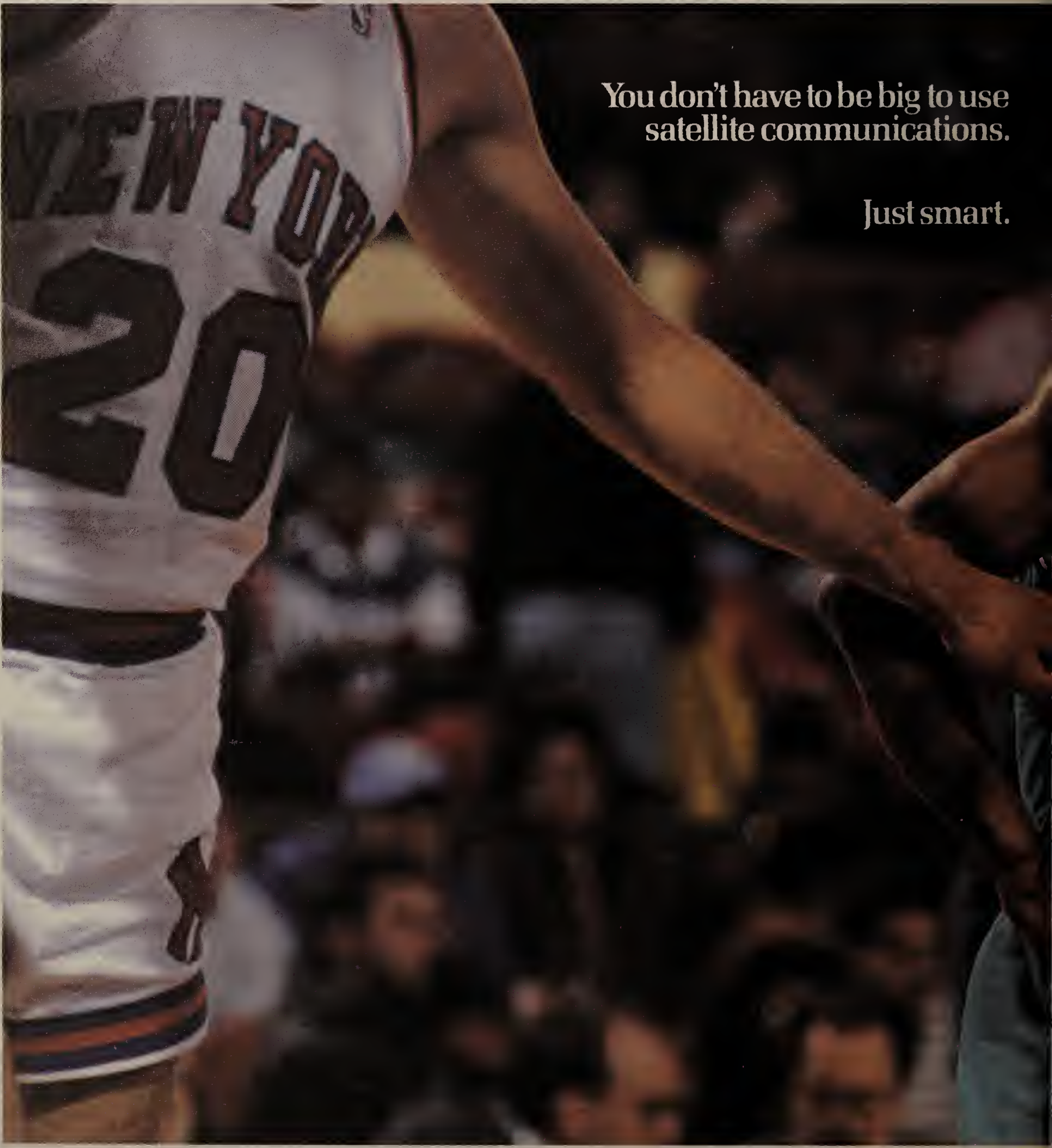
The dealers may also sign up for an independent private video service that supplies special auto industry programming. Specialized programming for financial, law enforcement, security and other industries are also available and can be a major additional benefit for video-equipped VSAT networks.

> A key strength of VSAT is that backup can be built into the net at a considerably lower cost than terrestrial.
>
> ▲▲▲

For many companies, the cost of being out of service — in terms of lost business revenue — even for a short period is unacceptable. A key strength of the VSAT approach is that backup can be built into the network for many configurations at a considerably lower cost than a diversely routed terrestrial approach.

Backup for equipment or satellite outages, weather conditions or natural catastrophes can be available on an immediate or a delayed basis. The quicker the required service restoral, the higher the cost. Backup performance and cost depend on which solution is chosen for failures to the three major components of the VSAT network, which are:

- **Individual remote office.** Backup can be provided via an optional dial-up modem running on the switched telephone network. The major planning issue associated with modem use is deciding whether to use the vendor's shared hub or your host processor for support. While using your own host adds a level of backup security, it


You don't have to be big to use satellite communications.
Just smart.

In this fast-breaking business world, efficiency and reliability count for a whole lot more than size. So just because you're not the biggest player on the court doesn't mean you can't be in the game.

Today, whether you're in the Fortune 500 or still shooting for the Fortune 5000, VSATs are a practical solution if your business requires multi-point transmission of data and voice, as well as broadcast video.

For growing firms in retailing, energy, hospitality, financial services, insurance and manufacturing, satellite communication offers an affordable alternative to conventional phone links that often mean multiple providers, inefficient rate structures and less-than-dependable service.

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The winning edge in communications worldwide.

may require VSAT support of a second protocol if the main network has been doing protocol conversion on your primary traffic.

■ **Shared hub.** All equipment in VSAT shared hubs is fully redundant, and outages are rare. However, in the event of an earthquake or other major catastrophe, most vendors will have a designated backup hub available.

The major issue in catastrophe backup is your service restoral time. Unless pinned down, it can take as long as a month for a vendor to implement "guaranteed" backup service. Depending on how much the user is willing to pay, vendors can provide guarantees of much shorter service restoral times, ranging from 20 minutes to several hours or several days.

■ **Satellite.** There have been no known failures of commercial satellites once they are placed into service. However, this does not obviate the need for you to check the backup for your satellite service. Does the vendor own or lease space on multiple transponders on multiple satellites in order to back up single or total failures? What service restoral time, at what cost, does your vendor offer? Can other organizations preempt your service or restoral time because your vendor has committed a higher level of service to them?

Control and monitoring capabilities for the entire VSAT service enable on-line traffic analysis.

▲▲▲

Network management

All VSAT providers offer integrated network management facilities. Control and monitoring capabilities for the entire VSAT service enable on-line traffic analysis and resource changes to meet operational needs. Remote failure analysis permits online correction of many problems and rapid dispatch of service personnel for the remainder.

These facilities are usually operated by the shared hub vendors as a part of their services. Some provide network management consoles, which may be remotely located in your facility. These remote net management consoles can provide you with monitoring and, in some cases, basic operational control of your network, even though it is running on a shared hub.

The industry has moved beyond network management basics, and most vendors now provide interfaces to IBM's NetView or AT&T's Unified Network Management Architecture. This is a step toward integration of all of the different network facilities.

International capabilities

International borders are slowly opening up to private VSAT networking. Both Canada and Mexico have executed bilateral transborder service agreements with the U.S. But don't plan an extensive network serving all countries just yet. Each country imposes some unique restrictions.

Don't plan an extensive network serving all countries just yet. Each country imposes some unique restrictions.

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Canadian law prohibits transmission of all but incidental two-way services — meaning less than 10 sites — across the border. Another problem is that the footprints of most U.S. satellites do not cover the northern Canadian provinces or if they do, 3.7-meter deicer-equipped antennas may be required.

An alternate transborder approach is to send data via a land line to a Canadian VSAT carrier, which will handle your traffic via the Canadian Anik satellite.

Privately owned networks may be implemented between Mexico and the southern portion of the U.S. using the Morelos satellite. Private network links to Mexico from northern states may be established through international teleports.

Private satellite network services to Central America, South America and Europe are now available. Many of the major U.S.-based VSAT service suppliers, in addition to suppliers specializing in international private networks exclusively, provide these services. The key issue in these private services to and within foreign countries is the vendor's resident support in each country served.

(continued on page 40)

Nathaniel Butler/NBA Photos

And by utilizing shared hub services, mid-sized firms can realize the benefits and dependability of satellite solutions without incurring big-league capital costs.

When companies (large and not so large) turn to satellite solutions, more turn to Hughes Network Systems than any other company in the world. We've installed 7 out of 10 Ku-band VSATs in use today. Not because we're the biggest. But because, just like you, we've never stopped competing to be the best.

If you would like to learn more about satellite solutions for your growing business, call Hughes Network Systems at (301) 428-5500, ext. 3751, or write us at 11717 Exploration Lane, Germantown, MD 20876, USA.

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VSAT service providers

Company	Service	Shared hub locations	Disaster recovery backup hub locations	Single vendor turn-key service	Remote network manage-ment console	NetView interface	Video uplink	Supplier of VSAT hardware	Private hub conversion option	Satellite support	Satellite frequency band used	Data Protocols supported	Special services
AT&T Tridom **Atlanta** **(404) 426-4261**	AT&T Skynet Clearlink	Atlanta, Los Angeles and New York	Atlanta (2), Los Angeles and New York	Yes	Control, monitor	Yes	Yes	AT&T Tridom	Yes	Provided via multiple transponders with inter-satellite protection	Ku, C	Asynchronous, SDLC, X.25, X.3, X.28, SCADA, others via external PAD	Full turnkey VSAT and terrestrial networks; SCADA; video services; electronic mail
AvData Systems, Inc. **Atlanta** **(404) 523-2848**	AvData	Atlanta and Dallas	Birmingham, Ala.	Yes	Control, monitor	No	Yes	NEC America, Inc.	Yes	Provided via leased transponder	Ku	Asynchronous, SDLC, BSC 3270, X.25, X.3, HDLC, Burroughs	Full service design and operation of private data networks; Mexican trans-border networks
Canadian Satellite Communications, Inc. **Mississauga, Ont.** **(416) 272-4960**	Satlink/VSAT	Mississauga, Ont.	Planned	Yes	Control, monitor	No	Yes	Satellite Technology Management	Yes	Provided via special procurement with inter-satellite protection	Ku	Asynchronous, SDLC, X.25, X.3, X.28, HDLC, PARS, DDCMP, Asynchronous Poll/Select	Mobile, point-to-point; business television; disaster recovery; cross-border service
Computer Power, Inc. **Jacksonville, Fla.** **(904) 350-0270**	CPI Datanet	Jacksonville, Fla.	Carlstadt, N.J. (Comdisco, Inc.)	Yes	Control, monitor	Yes	No	Hughes Network Systems, Inc.	Yes	Provided via leased transponder with inter-satellite protection	Ku	Asynchronous, SDLC, BSC 3270, X.25, HDLC, Burroughs, HASP, DDCMP	Extensive disaster recovery support; management tools for hybrid networks; data processing services
Contel ASC **Rockville, Md.** **(800) 533-3891**	Data Messenger Network	Mountain View, Calif.	Multiple	Yes	Planned	No	No	Contel ASC	Yes	Provided via multiple leased transponders with inter-satellite protection	C	Asynchronous, SDLC, BSC 3270, X.25, X.3, X.28, PARS, Burroughs, DDCMP, SCADA	End-to-end data communications service; in-house field services; virtual hub services from over 50 cities
Cylix Communications Corp. **Memphis, Tenn.** **(901) 761-1177**	Micro-Hub	Memphis, Tenn.	Memphis, Tenn.	Yes	Monitor	Planned	No	Comstream Corp.	Yes	Provided via leased transponder	Ku, C	SDLC	Micro-Hub with network status terminal; hybrid VSAT and terrestrial networks
GTE Spacenet Corp. **McLean, Va.** **(703) 848-1317**	Skystar	Chicago, Houston, Minneapolis and New York	Chicago and New York	Yes	Control, monitor	Yes	Yes	NEC	Yes	Provided via multiple owned satellites with inter-satellite protection	Ku, C	Asynchronous, SDLC, BSC3270, X.25, X.3, X.28, Burroughs, SCADA, 8A1	Full service design, implementation and management of private data, video and audio networks
Hughes Network Systems, Inc. **Germantown, Md.** **(301) 428-5840**	Integrated Satellite Business Network	Los Angeles, Minneapolis and New York	Germantown, Md.	Yes	Control, monitor	Yes	No	Hughes Network Systems	Yes	Provided via multiple owned satellites with inter-satellite protection	Ku, C	Asynchronous, SDLC, BSC 3270, X.25, X.3, X.28, HDLC, PARS, Burroughs, DDCMP, SCADA, Tinet	Interactive voice; "hoot 'n' holler" voice; SCADA support; retail point-of-sale networks; broadcast video
JFL Communications, Inc. **Stafford, Texas** **(713) 261-0708**	JFL	Denver, Houston and Anchorage, Alaska	Transportable hub	Yes	Control, monitor	No	No	Components assembled by JFL Communications	Yes	Provided via multiple leased satellites with inter-satellite protection	Ku, C	Provides circuit-switched channels; no inherent protocol conversion	Oil drilling industry service; emergency communications restoration
Nova-Net Communications, Inc. **Englewood, Colo.** **(303) 799-0990**	National VSAT Network	Denver; Houston; Mountain View, Calif.; San Francisco; and Washington, D.C.	Denver and Washington, D.C.	Yes	Control, monitor	Planned	Yes	Contel, NEC	Yes	Provided via multiple transponders with inter-satellite protection	Ku, C	Asynchronous, SDLC, BSC 3270, X.25, X.3, X.28, HDLC, Burroughs, SCADA	Full service SCADA network provider; 24-hour management of hybrid VSAT and terrestrial networks
Pittsburgh International Teleport **Pittsburgh** **(412) 337-1888**	Flex-net	Pittsburgh	Planned	Yes	Control, monitor	Planned	Yes	Hughes Network Systems	Yes	Provided via leased transponder with inter-satellite protection	Ku	Asynchronous, SDLC, BSC 3270, X.25, X.3, X.28, HDLC, PARS, Burroughs, HASP, DDCMP, SCADA	Video turnkey; full network management; full service satellite networks
Racal-Milgo SkyNetworks, Inc. **Charlotte, N.C.** **(800) 377-2232**	SkyNetworks	Charlotte, N.C.; Dallas; Duncan, S.C.; Delaware, Ohio; Omaha, Neb.; and Syracuse, N.Y.	Charlotte, N.C.	Yes	None	No	No	NEC	Yes	Provided via multiple leased transponders	Ku	Asynchronous, SDLC, BSC 3270, X.25, X.3, Burroughs	Management of hybrid VSAT and terrestrial networks
Scientific-Atlanta, Inc. **Melbourne, Fla.** **(407) 255-3146**	SkylinX.25	Atlanta, Detroit, Los Angeles and Melbourne, Fla.	Altanta and Melbourne, Fla.	Yes	Control, monitor	Planned	Yes (in Detroit)	Scientific-Atlanta	Yes	Provided via multiple transponders with inter-satellite protection	Ku, C	Asynchronous, SDLC, X.25, X.3, X.28, HDLC, SCADA, X.25 PAD support	Virtual subnetwork services; backup system for remote dial recovery; automotive industry service
Satellite Technology Management, Inc. **Costa Mesa, Calif.** **(714) 557-2400**	X-Star	Costa Mesa, Calif.	None	Yes	Control, monitor	No	No	Satellite Technology Management	Yes	Provided via single transponder	Ku, C	Asynchronous, SDLC, X.25, X.3, X.28, HDLC, PARS, DDCMP, Asynchronous Poll/Select	Customized protocols and applications; full-size and micro-hub systems available
Telesat, Canada **Ottawa, Ont.** **(613) 748-0123**	Anikom 200 VSAT	Toronto, Montreal	Planned	Yes	Planned	Planned	Yes	Hughes Network Systems	Yes	Provided via single-owned satellite with inter-satellite protection	Ku	Asynchronous, SDLC, BSC 3270, X.25, X.3, X.28, HDLC, Burroughs, HASP, DDCMP, SCADA	Customized networks designed to user applications; cross-border services; single contact point

Disaster recovery backup hub location = For each city named, backup service is offered only from that location. Backup and recovery time and pricing vary widely.
Single vendor turnkey service = Provide systems design, installation, maintenance and space segment under separate order or from a single source on a turnkey basis.
Remote network management console = Monitor capability lets shared hub customers monitor their traffic via a remote display console. Control capabilities, if provided, permit system reconfiguration and other network management functions.
Video uplink service = Permits VSATs to receive video broadcast via the same satellite that supplies data services. Vendors offering this service provide it from their shared hub. Vendors not offering this service use a different hub for video.
Satellite support = Some vendors supply satellite capacity via a single transponder, multiple owned transponders or whole satellites. Others supply capacity under long-term bulk service lease or lease capacity on special order.
Special services = Vendors' special capabilities.
"Hoot 'n' holler" voice = A multipoint voice conferencing channel, used primarily by stockbrokers.

DDCMP = Digital Data Communcations Message Protocol
PARS = Programmed Airlines Reservation System
SCADA = Supervisory Control and Data Acquisition

This chart includes a representative selection of VSAT service providers. Many vendors not included may offer competitive products.

SOURCE: COMMUNICATION STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.

On April 26,
an awesome fight
will end in a technical knockout.

Okay, so it won't exactly be Tyson-Holyfield, but The Computer Museum's 3rd Annual Computer Bowl still promises to be one of the most exciting quiz games you'll ever witness. Join us ringside for round after round of mind-boggling action as the finest minds in the East and West go head to head. See who ends up on the ropes first. See who beats whom to the punch. But, most important, see who's left standing when all is said and done. The place: The San Jose Convention Center, San Jose, CA. With live broadcast via satellite to The Computer Museum in Boston. Don King, eat your heart out.

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Author

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International Business Machines Corporation

James E. Clark
AT&T Computer Systems

Samuel H. Fuller
Digital Equipment Corporation

John Markoff
The New York Times

WEST COAST TEAM

Heidi Roizen, Captain
T/Maker Company

Dave House
Intel Corporation

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Radio Shack

Philippe Kahn
Borland International Inc.

David E. Liddle
Metaphor Computer Systems

The Computer Bowl is a project to benefit the educational programs of The Computer Museum, 300 Congress Street, Boston, MA 02210.

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The Computer Bowl

Satellite nets take off

continued from page 37

For companies that outsource their communications needs to a shared hub vendor, the procurement contract is critically important.

The vendor's willingness to modify its standard contract to meet your requirements is the final and possibly most important consideration of your procurement process. Vendor performance, service and reliability claims will be of little benefit to you if you cannot obtain and verify a specific meaningful description of all required operational specifications for your individual network, testing methods and remedies if their service falls below required levels.

Obtaining five-year contractual price protection and service guarantees will be of little benefit if the contract for satellite service is full of specialized, technical loopholes permitting exceptions to pricing and service levels, or levying additional charges.

Be sure to set aside significant time for the contract analysis and negotiation process — in many cases, more time than was spent preparing the request for proposal and vendor evaluation. This is not a task that you can easily relegate to attorneys because they have no understanding of your technical and operational issues. Specialized, satellite-related technical, business and operational skills, plus a final legal review, are required to close this final step of long-term network procurement.

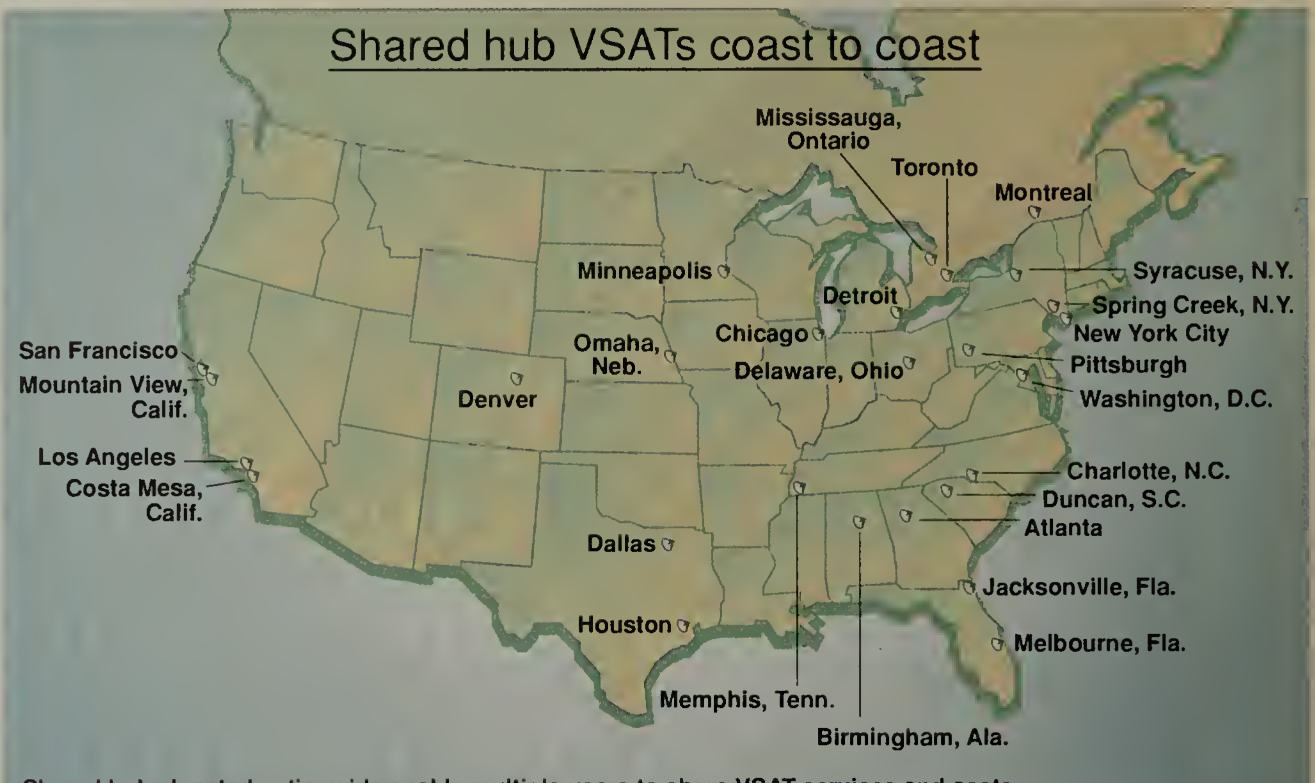
The trade-offs involved in implementing VSAT networks have become more complex in recent months, and users must balance the need for bandwidth on demand, quick response and network reliability against the costs of the options now available to them.

Nevertheless, VSATs have passed the test of applicability for use by businesses. Now the service reliability, performance and pricing options they provide — and the capability to outsource user needs for five or more years — have further increased the appeal of this service. As we move into the demanding multiple information forms of the 1990s and their application needs, the solution may be a VSAT net.

Mexican and South American VSAT service providers

Company	Service	Description
Alpha Lyracom Pan American Satellite Greenwich, Conn. (203) 622-6664	PanAmSat	International private network carrier
Vitacom Communications Co. Mountain View, Calif. (415) 969-6800	Vitacom	International equipment supplier and systems integrator

SOURCE: COMMUNICATIONS STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.
GRAPHIC BY SUSAN SLATER



Shared hubs located nationwide enable multiple users to share VSAT services and costs.

GRAPHIC BY SUSAN SLATER SOURCE: COMMUNICATIONS STRATEGIES ASSOCIATES, INC., CUPERTINO, CALIF.

Letters

continued from page 33

Northern Telecom, Inc.'s SL-1 implementation of Integrated Services Digital Network Primary Rate Interface. The reviewer happened to zero in on a section that deserved this kind of detail — the comparison of specific vendor implementations of ISDN PRI.

As to the reviewer's charge that our book does not live up to its title, *Network World* readers are invited to judge for themselves. If the book fails to live up to its claims, buyers may return it to Artech House for a full refund.

Robert Davidson
Nathan Muller
Authors
LANs to WANs: Network Management in the 1990s

National security

While reading Ken Foley's article "A hawk's eye watches Desert Storm" (*NW,* Jan. 28), I was shocked to see him name the ship that controls communications for our Persian Gulf war effort. He apparently gained knowledge of this through his work with the U.S. Navy and through his informal Navy contacts. I am quite sure that he has violated not only the trust of these individuals, but also any nondisclosure agreements he made with the Navy.

More importantly, Mr. Foley has violated the rights of the U.S. military personnel who must rely on these vital communications links for their lives. The families of these brave men and women now have one more thing to worry about.

Finally, I am surprised that the editors of *Network World* did not perform their duties in a more responsible manner. The American people can only hope that Saddam Hussein and his henchmen are not readers of your publication.

Thomas Maxson
White Plains, N.Y.

Editor's reply:

We share your concerns about the safety of our forces in Operation Desert Storm. However, the name of the command ship is public information and has appeared in other publications.

Telecom licensing ideas

James Carlini's opinion column "When did communications consultants become plumbers?" (*NW,* Jan. 28) seems to imply that given a set of consultants, those without engineering licenses will perform much better than those with them.

Passing the professional engineer (PE) exams ensures that the engineer has at least some understanding of other related engineering fields — including plumbing. While a license does not guarantee high professional performance, those who don't live up to the standards can lose it.

The real issues to be addressed are not whether to require licenses, but how to establish a fair working process. Here are some ideas:

Instead of requiring a PE license, telecommunications professionals may have their own set of requirements, as do structural engineers. Years of experience may substitute for formal education.

Two types of licenses may exist: state and interstate. The latter may require more extensive qualifications before it is accepted by all the states.

In a society where food is certified by the Food and Drug Administration, illnesses are treated by licensed physicians and vehicles are controlled for the amount of pollution they add to the atmosphere, even plumbers understand that licensing enhances professionalism and user protection.

This being the case, it is time for telecommunications professionals to get certified as well.

Victoria Fineberg
Ocean, N.J.

People & Positions

continued from page 9

chairman of AT&T Communications, Inc. The position of chief financial officer will be filled at a later time, AT&T said.

George Heilmeier, currently senior vice-president and chief technical officer at Texas Instruments, Inc., was named president and chief executive officer of **Bell Communications Research,** a position he will assume March 1. The Bellcore board of directors also announced that it has designated Bellcore's current president, **Rocco Marano,** as chairman of the board, a position he will hold until his retirement on May 1. Marano, 63, has headed Bellcore since its formation in 1984 after the breakup of the Bell system. Bellcore provides research and technical support to the seven units created by the court's divestiture of AT&T.

Bridgewater, N.J.-based **Integrated Network Corp.** recently announced that **Gregory Langford,** formerly the assistant vice-president of product marketing at Timeplex, Inc., has been named vice-president of marketing.

Langford will oversee product management and marketing activities, as well as corporate marketing and communications. He replaces **Craig Bender,** who was named vice-president of strategic planning and new business development.

The role of chaos in change

continued from page 32

support of another goal. Personnel and specialized work units may be shifted throughout the organization to complement the resources of other departments or work groups. And with communications networks, it is no longer necessary to physically move personnel, hardware and other resources to achieve new organizational structures. Such changes need only occur on a logical plane.

Instead of physically allocating resources to such endeavors, including office space and support staff, resources would be logically allocated and protected with appropriate security measures, enabling much of the development to be done over the existing network without sacrificing the integrity of the project.

One final lesson of chaos science is that appropriate responses to external pressures create a positive feedback loop that becomes self-sustaining — a snowball effect.

For example, the commitment of resources to fund a new business venture by an employee who has discovered an unaddressed customer need can lead to increased funding, which in turn ensures the successful marketing of the product, leading to higher sales.

Higher sales increases the success of the business venture, which may take on the status of a subsidiary with its own operating budget.

Conceivably, this status could enable it to engage in strategic alliances with other firms, providing the foundation for further product development to eventually enhance profits and competitive position.

The 1990s promise to bring major change, from which the world will emerge a much different place.

In order for corporations to survive, they must view change as opportunity. Those that understand the nature of change and can adapt quickly to seize the opportunities it exposes will survive and grow. Those that can't adapt, for whatever reason, face the possibility of extinction.

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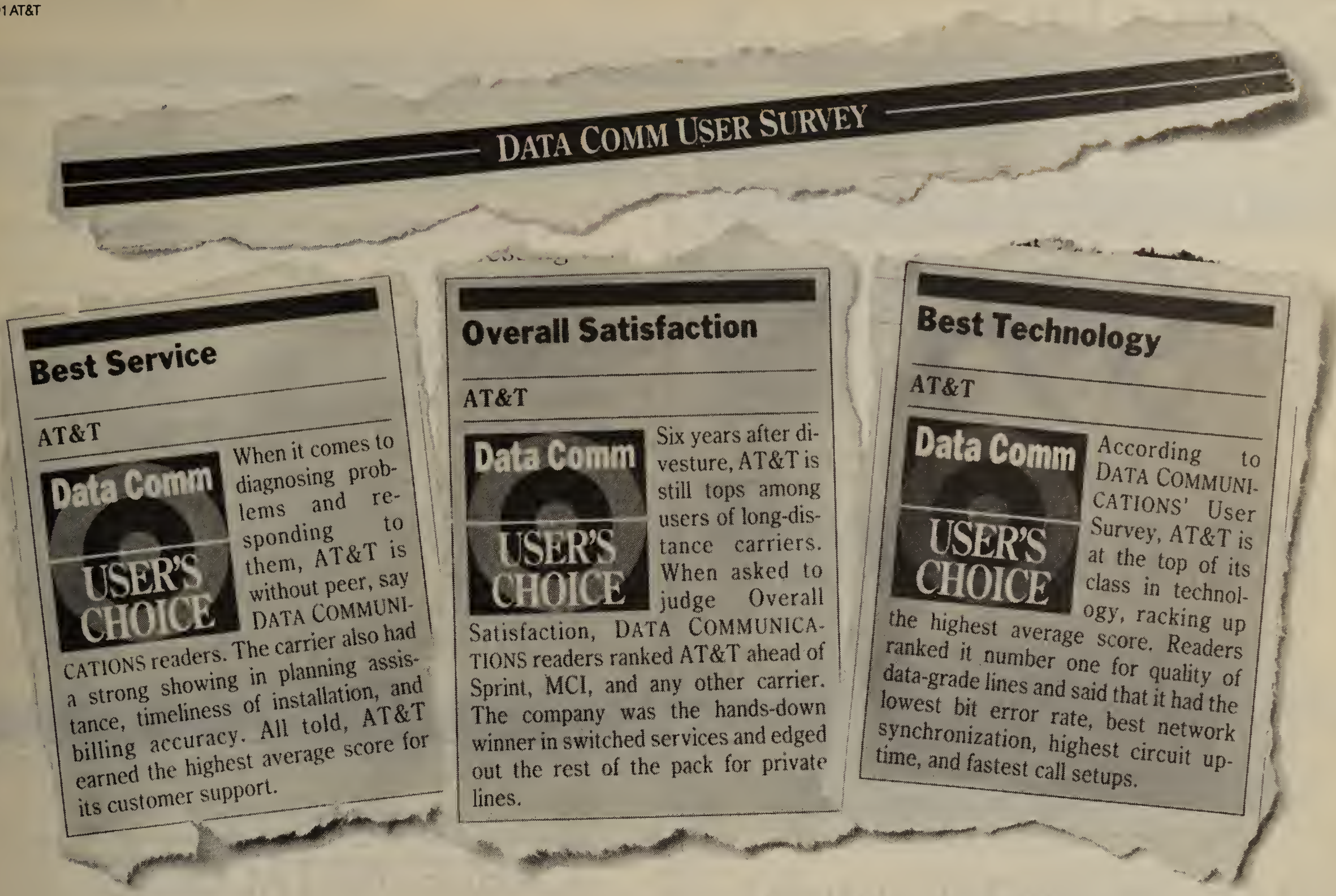
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Six years after divesture, AT&T is still tops among users of long-distance carriers. When asked to judge Overall Satisfaction, DATA COMMUNICATIONS readers ranked AT&T ahead of Sprint, MCI, and any other carrier. The company was the hands-down winner in switched services and edged out the rest of the pack for private lines.

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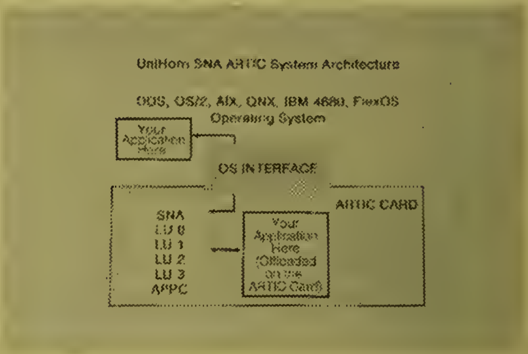
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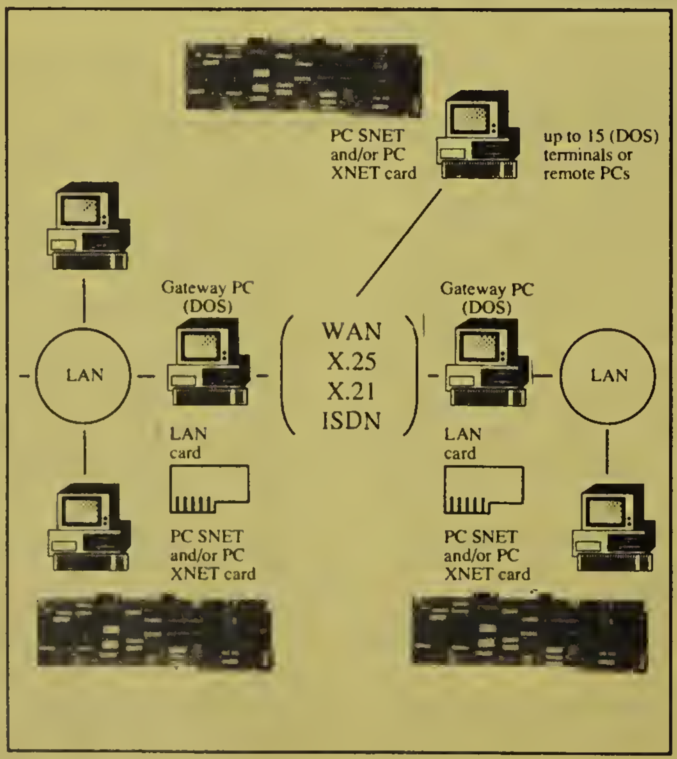
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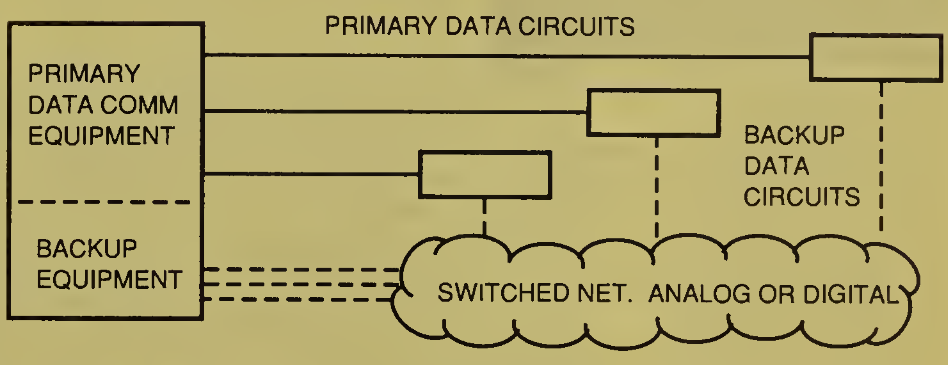

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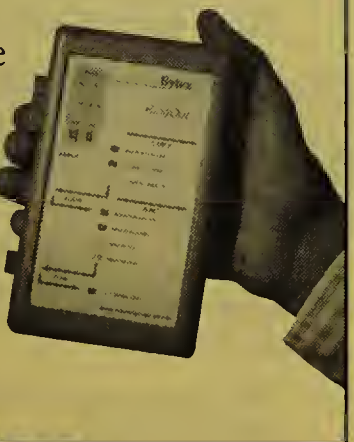

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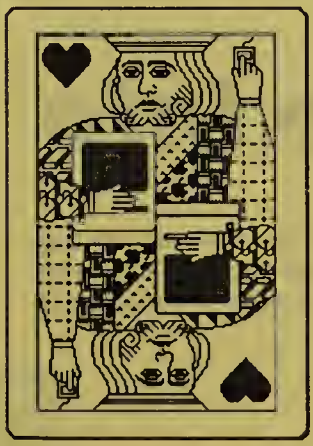

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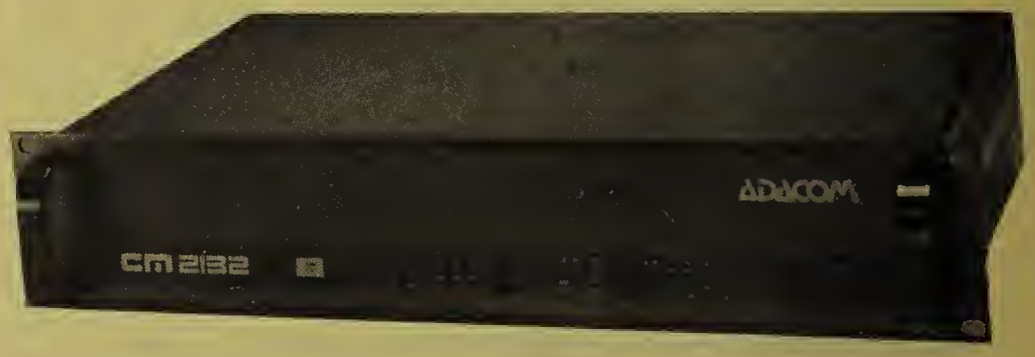

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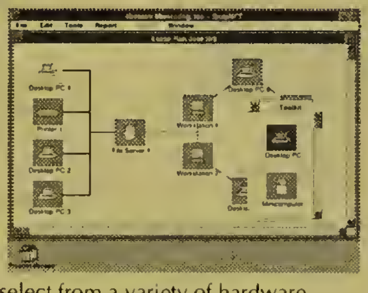

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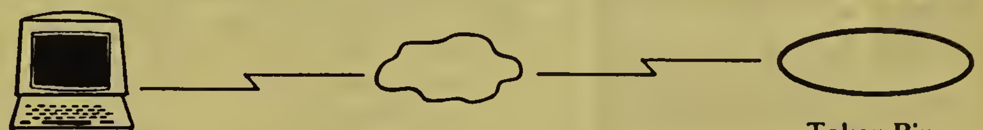

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For further information: Please call Pam Valentinas at 1-800-622-1108 (or in MA, 508-875-6400)

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Telecommunications Engineers

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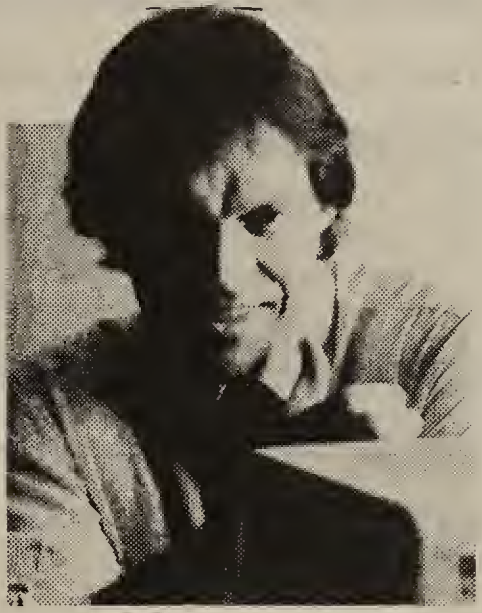

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Space and copy closing for next updated issue is February 21. Listing begins in March 18 issue and runs through the September 9, 1991 issue.

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NETWORKING RESOURCE DIRECTORY

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Special: Lead Service

May 20
Virtual networks update

May 27
SNA Update

GE seeks service edge via net

continued from page 1

GECFS decided that the key to enhancing service was to upgrade its information systems, which until about a year ago were anchored by a Honeywell, Inc. mainframe here.

Today, the company has 17 4M bit/sec Token-Ring Networks supporting 700 IBM Personal System/2s. The LANs are connected by a 16M bit/sec fiber-optic backbone running throughout a two-building complex here. The backbone is linked through another Token-Ring to a 3745 Communication Controller, which is tied via four 56K bit/sec lines to a host in Stamford, Conn.

About 200 of the PS/2s run a handful of staff-developed cooperative processing applications — including an Application System/400-based Vehicle Configurator, which is an expert system that helps select the most cost-effective options when buying new cars, and a Maintenance Management Program, which is offered with each of the 400,000 cars GECFS currently leases.

The application supporting the maintenance program provides a good example of what cooperative processing has meant for GECFS.

The system is used to track every repair made to the 110,000 cars enrolled in the program, including information about which service stations performed what repairs, the quality of those repairs and a wealth of other data — all of which adds up to valuable reference and trend analysis data.

The application is used by 55 Vehicle Maintenance Administrators (VMA), who are mechanics by trade. They field calls from corporate fleet administrators, mechanics at independent repair shops and car drivers.

Since the new system was put in place, 10,000 cars have been added to the maintenance program but no new staff has been required, said Ron Fordahl, manager of the maintenance control center here. GECFS' hiring ratio has gone from one person per 2,000 vehicles to one per 2,500.

This was possible because the new system is faster and easier to use than the old one and provides more data.

LAN central

For each of the 1,000 corporations that lease cars from GECFS, the company keeps a client parameter file on a PS/2 Model 70 configured as a Novell, Inc. NetWare server. The file contains information ranging from customer preferences in terms of equipment, such as tires, to a dollar amount for repairs that can be performed without permission.

Each morning, the 1,000 parameter records are downloaded and stored on the hard disk of each VMA's PS/2. That gives the VMA immediate access to the information and also helps keep traffic off the LAN, Runge said.

Much of the data required by the LAN-based management program, however, is stored on a remote mainframe because it is used to back up other GECFS applications and is too voluminous to store locally.

When a VMA reaches a point within the PS/2 maintenance program that requires information stored on the remote host, the application will automatically establish an Advanced Program-to-Program Communications session with the mainframe.

For example, VMAs can use the LAN-based maintenance application to find the appropriate repair shops for clients. It accepts phone numbers, zip codes or city and state names as search criteria.

When it comes time to conduct the search, the LAN application — realizing it doesn't have the data base locally — establishes an APPC session with the remote mainframe.

The mainframe component of the application then searches a Computer Associates International, Inc. IDMS data base to find all the suppliers that meet the criteria and sends the result back to the PS/2, typically with subsecond response time.

On a monthly basis, a report is generated based on the information VMAs entered to repair orders. Based on those reports, GECFS can determine if certain types of parts are failing prematurely. The company can then identify every auto for which such a repair was conducted and seek reimbursement from the manufacturer even if the warranty is up, thus saving clients' money.

Besides providing more detailed information, getting the LAN-based applications to cooperate with remote host programs has proven to be more efficient than simply using 3270 terminals, Runge said.

For example, every APPC transaction on the network uses a 4K-byte packet, which is pure data except for a 20-byte header. By contrast, it would take between three and six 3270 transactions to transfer that much data because of all the screen formatting data sent with each 3270 transaction, Runge said.

That's a big consideration, because the maintenance application alone is responsible for about 30,000 transactions per day to the mainframe. Using 3270 terminals, that would translate to some 250,000 transactions.

And the response time using LANs and APPC is exceptional.

In a stress test run before the first cooperative processing applications were put on-line in January 1990, 22 PS/2s each fired a transaction requesting 4K bytes of data at the mainframe every 30 seconds. For 35,000 transactions, subsecond response time was achieved 99% of the time.

"The things I'm telling you now I wouldn't have mentioned two years ago because it would've given our competitors wind of what we were doing," Runge said. That's not a problem today because "by the time they get the system up and going, we're going to be two years farther off than that."

MCI offers new pricing, options

continued from page 5

providers. "Overall, [they] found long distance to be confusing and complicated," she said.

For example, customers had problems managing multiple bills for different services that came due at various times during the month, Dunlap said, adding that customers felt they spent too much time trying to manage their telephone bills.

MCI Preferred consolidates all charges, even those for residential calls, into one bill and provides a volume discount for aggregate usage. Customers will be able to use account codes to make it easier to charge back different departments or clients, Dunlap said.

Charges of more than $200 per month will be discounted 10%. Additionally, MCI is offering an "optimizer discount" that provides another 10% discount on all calls placed to the most frequently dialed area code.

MCI will also offer management reports to help users analyze their traffic patterns. In addition, users can designate one line for fax usage and receive a report on those calls.

MCI is also rolling out a new calling card for MCI Preferred that gives small users access to network features such as conference calling, voice mail, voice messaging, a voice news network and speed dialing.

MCI Preferred customers pay 23.5 cents per minute for 800 and outbound voice calls, regardless of distance. Calls placed during evening and weekend hours are discounted 30% and 45%, respectively, from the flat rate price.

To underscore the importance MCI places on the small business user, the carrier had MCI Chairman and Chief Executive Officer William McGowan on hand at a press conference last week to promote the new service. "Until now, small businesses have been left standing on the sidelines of the information age," he said.

McGowan said there are about 5 million small businesses in the U.S. that spend $6 billion annually on telecommunications.

Squabble over radio spectrum

continued from page 1

likely to stir debate, a more immediate cause for concern was Sikes' admission that current microwave users will be affected by the FCC spectrum review kicked off last year.

That review is examining how the radio spectrum is currently used and is intended to determine how to find space on the crowded airwaves for emerging wireless technologies.

Many participants in the personal communications network (PCN) industry, including Apple Computer, Inc. and Millicom, Inc., believe PCN services would be best provided using frequencies in the 1.8- to 2.3-GHz range — the bandwidth currently occupied by microwave users in the utility, petroleum, public safety and railroad industries.

The FCC has begun a "refarming initiative" as part of the overall review to try to find new bandwidth for microwave users that are likely to be affected if the bandwidth is granted to PCN.

Microwave users in the industries likely to be afflicted emphasized that they have millions of dollars invested in equipment and do not view wire-based services as an alternative.

Over the last year, the FCC has held out the hope that experiments it has authorized using spread-spectrum techniques would show that radio bandwidth can be shared by both PCN and microwave users, thus obviating the need for spectrum reallocation.

Some users have already begun examining how bandwidth-sharing would affect them.

"We have tests under way to determine what kind of interference we may run into if others start using the same frequencies we use today," said Nick Noecker, an energy consultant with Tenneco Corp.'s automation services.

But last week, Sikes cut to the quick of it. "Our refarming initiative will be difficult," Sikes said. "Nobody wants to move." He said users of fixed microwave systems may be asked to move to other frequencies or to alternative means, such as fiber-optic cable.

He said the FCC is studying the refarming issue based on a cost analysis to determine the least economic impact on all involved. The FCC wants to create a "spectrum reserve" of 350 MHz to be later assigned for voice and data PCN, digital radio and other advanced cellular technologies.

Bob Raish, an attorney with Fletcher, Heald and Hildreth who represents railroad industry microwave users, said the existing operations of railroads, utilities and public safety agencies would be severely hurt.

In the longer term, radio spectrum auctioning could become an even more controversial issue.

Under today's method of spectrum management, the FCC licenses radio spectrum to users free of charge. The Bush administration policy advocates selling off spectrum used for telecommunications purposes.

The recently issued "Economic Report of the President" emphasizes, "In particular, when portions of the spectrum previously reserved for government use are made available to the private sector, they should be auctioned off without restrictions."

The Emerging Telecommunications Technologies Act of 1991 proposes to take 200 MHz of spectrum currently used by the government so that the FCC can allocate it for private sector use. The bill has received wide support from industry.

Sikes, backing the concept of auctioning frequencies outside of those used for radio, television or public safety use, said the framework for bandwidth sales still needs to be defined.

At the hearing, Rep. Edward Markey (D-Mass.) said Congress is ready to work with the Bush administration to get the bill passed. He said Congress expects to receive a spectrum auction plan from the current administration in the near future.

NETWORK WORLD

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Hughes preps for DECnet Phase V

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protocol routing backbone and making guidelines for how DECnet Phase V nodes are named.

Since its address space is limited to 16 bits, DECnet Phase IV can support no more than 63 areas comprising as many as 1,023 nodes each. DECnet Phase V's address space is much larger, making it possible for users to segment a DECnet Phase V net into infinitely more areas, each supporting thousands of nodes.

Hughes' DECnet Phase IV problem stems from the fact that it shares a Phase IV DECnet with General Motors Corp., whose GM Hughes Electronic Corp. subsidiary owns Hughes Aircraft.

GM has been assigned the first 39 areas of the DECnet for its use, leaving Hughes with 24 addressing areas. Hughes has already used more than half of its DECnet areas and may not have enough left to support expansion plans.

The company assigns one or more DECnet areas to each of its operating groups.

"Hughes is a spread-out company," MacLean said. "So we are running out of areas."

Even though DECnet Phase V is not shipping, DEC has provided enough information about its node naming for Hughes to develop guidelines that will make it easier to implement DECnet Phase V's Distributed Name Service (DECdns). DECnet Phase V will use DECdns to enable users to address traffic to other nodes using a simple name rather than a cryptic address, as is the case with DECnet Phase IV.

DECnet Phase V traffic addressed to a node name will be routed to a VAX running DECdns software, which translates the name into the node address and forwards it to the destination.

Hughes is testing an early version of DECdns that works under DECnet Phase IV. The company has found that it will need to add more power to existing VAXes running DECdns or dedicate some VAXes as DECdns servers.

Hughes' DECnet Phase V migration planning coincides with its need to upgrade existing bridged network architecture to multiprotocol routers. Currently, EDEN uses a series of local and remote bridges to link nets supporting DECnet, Transmission Control Protocol/Internet Protocol and a mix of other traffic.

Hughes uses DEC LAN Bridges to link Ethernet segments in the same building or campus of buildings and Vitalink Communications Corp. TransLAN bridges to link remote Ethernets to its backbone. The backbone consists of 56K bit/sec, 256K bit/sec or full T-1 channels on Hughes' Integrated Digital Network.

"At the time EDEN was built, bridges were the only way to build this type of multiprotocol network," said Ngai-Lim Wong, EDEN senior systems engineer.

However, using bridges forced Hughes to devise a way to prevent all traffic from reaching the wide-area network and congesting the links. So the company used bridge software filters to create what it calls logical routing.

Logical routing uses Ethernet multicast addresses to prevent certain traffic from reaching wide-area links. Multicast addresses identify which transmission protocol and type of data is within an Ethernet packet.

In EDEN, DECnet traffic addressed to a node in the same area is broadcast across the local Ethernet to its destination. It is also received by a DECnet router and a TransLAN bridge.

The router is configured to ignore traffic destined for a node in the same area, while the TransLAN bridge prevents traffic with certain addresses from reaching the WAN. If the data is destined for a node in another DECnet area, the router changes the multicast address and sends the packet to the TransLAN bridge, which forwards it across the backbone.

MacLean said this concept only works with DECnet traffic because EDEN has no TCP/IP routers. Thus, all TCP/IP traffic is forwarded across the WAN via bridges even if the intended receiver is in the same location.

Installing multiprotocol routers that support DECnet Phase IV and Phase V as well as TCP/IP will help Hughes reduce traffic on the WAN. "We've taken bridging technology as far as it can go," MacLean said. "We have to start routing this traffic."

HP to bolster LAN line

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dard for running Ethernet over unshielded twisted-pair wire.

HP was able to engineer such a low-cost product by teaming up with AMD to develop the hub with fewer on-board chips than other products on the market.

The other significant aspect of the product rollout, analysts said, will be the OpenView enhancements. A key addition is an automatic discovery capability that looks at traffic broadcast across the net and subsequently builds a map of all devices on the LAN.

According to Shirley Hunt, an analyst at Dataquest, Inc. in San Jose, Calif., the new HP hub can use OpenView to read Internet Protocol packet addresses, match them to physical locations and create a map. Since any EtherTwist hub can read any IP address, the map can include both HP and non-HP devices, a capability she said is lacking in other network management packages.

Additional software upgrades to OpenView include HP OpenView Bridge Manager and HP OpenView Hub Manager. Based on the Simple Network Management Protocol (SNMP) standard, together the products will be able to manage and control hubs and bridges using IP-based routers throughout the net.

The HP Fiber Optic Hub Plus offers as many as eight fiber-optic connections to work groups on different floors within a building or multiple networks within a distance of about 1½ miles, according to HP. The HP Fiber Optic transceiver and HP ThinLAN transceiver will be able to connect users directly to fiber and thin coaxial cable-based networks through an attachment unit interface port.

> Analysts said OpenView's new mapping ability is unique.
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On the network management front, analysts said OpenView's mapping ability is unique but noted that HP still has not included such essential network management capabilities as an SNMP agent in its hub, which would enable third-party management consoles to control HP's SNMP-based bridges and hubs.

Analysts were also critical of the hub offerings' limited scope. The EtherTwist Hub, for example, will not support token rings. HP acknowledged the limitations but said enhancements are coming. "We're working on a token-ring product," said Alan Housley, product marketing manager. "In 1991, we'll provide a token-ring concentrator under OpenView Windows," he said, adding that HP is developing a Fiber Distributed Data Interface solution but did not offer a time frame.

The HP EtherTwist Hub Plus/48 will cost $7,999, the HP EtherTwist EISA Adapter Card/32 will be priced at $695, and the HP Fiber Optic Hub Plus will cost $3,299. All three are expected to be available May 1. The HP Fiber Optic transceiver and the HP ThinLAN transceiver will cost $499 and $239, respectively, and should be available April 1.

HP OpenView Bridge Manager software for HP EtherTwist bridge products will cost $1,999 and is expected to be available May 1. HP OpenView Hub Manager software for HP EtherTwist hub products will cost $1,499 and availability is expected May 1.

US West admits to violating MFJ

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partment will not hesitate to investigate and prosecute violations," the agency said.

US West is the second RBHC to be scrutinized by the Justice Department for possible violations. Last year, after an 18-month grand jury investigation set up by the department, Nynex Corp. was indicted for violating the decree's prohibition on information services. Although the evidence was strong enough for the jury to issue an indictment for criminal contempt, which requires a finding of willful violation, Nynex refused to admit wrongdoing.

> Although it refused to give details, the Justice Department intimated it is investigating others.
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Although it refused to give details, the Justice Department also intimated that it is investigating other RBHCs. One of the primary public benefits of reaching a settlement with US West, rather than going to trial, is that it will free up resources in the Antitrust Division for other cases, the agency said in court documents.

"By releasing these resources, the department can turn its attention to other matters arising under the decree," the Justice Department said. Numerous allegations of Modified Final Judgment violations are pending before the agency.

The four activities for which US West was fined were: discriminating in pricing of access services on a switching contract for the General Services Administration; providing debit card transaction processing for Atlantic Richfield Co.; designing and assembling operator workstations; and providing directory services of customers' names, addresses and phone numbers both over telephone lines and via computer links.

The directory service violated both information service and interexchange restrictions, according to the Justice Department.

Hamper freedom bid

Telecommunications attorneys in Washington, D.C. last week said these highly publicized examples of Modified Final Judgment violations may hamper the RBHCs' lobbying efforts to have Congress lift the decree's business restrictions. "The US West admissions represent another setback for the [RBHCs] campaign to amend the [Modified Final Judgment]," said James Casserly, a Washington attorney who represents clients opposed to the removal of the Modified Final Judgment restrictions.

"Even if some lawmakers have forgotten the years of antitrust violations that lead to divestiture and the line of business restrictions, they are not likely to overlook the mounting evidence of postdivestiture misconduct by the regional companies," Casserly said.

Observers also said these incidents further erode confidence that the Federal Communications Commission, which may be given oversight of the Modified Final Judgment, can enforce safeguards to prevent RBHC anticompetitive behavior in the future.

Although one of US West's violations involved discriminatory pricing of interexchange access services — an area within the FCC's jurisdiction — the agency never conducted its own investigation into the allegations.

Henry Levine, a telecommunications attorney who counsels large corporate clients, said users fear that the FCC lacks the resources and possibly the will to enforce the Modified Final Judgment. "The FCC is grossly understaffed," he said. "Overall, there is a high level of anxiety among large users and others that the FCC's enforcement capabilities are not up to its goals," he said.

Quagmire by-product

While these incidents are embarrassing, RBHCs maintain that they only point out how ambiguous the Modified Final Judgment's restrictions are and how easy it is to accidentally step over the line.

In a statement issued after the settlement was announced, US West officials said they regretted the violations but insisted that the firm had not intentionally entered into prohibited activities.

"We didn't willfully violate the MFJ, but these four activities, out of the thousands we engage in every day, were in conflict with the decree, which is a complex document governing a large and complicated industry," said Larry DeMuth, US West's chief counsel.

However, the Justice Department said the violations occurred because many US West officials held the judgment in contempt and thereby fostered an atmosphere in which violations might occur. "US West, more than any other party to the [Modified Final Judgment], took a public and private stance in opposing the decree," the agency said.

The department added that it believes US West officials, including newly elected President and Chief Executive Officer Richard McCormick, have a more supportive attitude toward the decree's regulations. This, combined with new procedures mandated by the Justice Department, should ensure future compliance, the agency said.

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